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Ontario

ENVIRONMENTAL ASSESSMENT BOARD

VOLUME: 75

DATE: Wednesday, February 22nd, 1989

BEFORE:

M.I. JEFFERY, Q.C., Chairman

E. MARTEL, Member

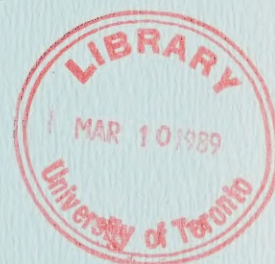
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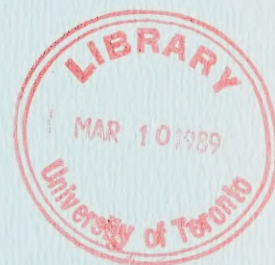
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HEARING ON THE PROPOSAL BY THE MINISTRY OF NATURAL
RESOURCES FOR A CLASS ENVIRONMENTAL ASSESSMENT FOR
TIMBER MANAGEMENT ON CROWN LANDS IN ONTARIO

IN THE MATTER of the Environmental
Assessment Act, R.S.O. 1980, c.140;

- and -

IN THE MATTER of the Class Environmental
Assessment for Timber Management on Crown
Lands in Ontario;

- and -

IN THE MATTER of an Order-in-Council
(O.C. 2449/87) authorizing the
Environmental Assessment Board to
administer a funding program, in
connection with the environmental
assessment hearing with respect to the
Timber Management Class
Environmental Assessment, and to
distribute funds to qualified
participants.

Hearing held at the Ramada Prince Arthur
Hotel, 17 North Cumberland St., Thunder
Bay, Ontario, on Wednesday, February 22nd,
1989, commencing at 9:00 a.m.

VOLUME 75

BEFORE:

MR. MICHAEL I. JEFFERY, Q.C.	Chairman
MR. ELIE MARTEL	Member
MRS. ANNE KOVEN	Member

A P P E A R A N C E S

MR. V. FREIDIN, Q.C.)	MINISTRY OF NATURAL
MS. C. BLASTORAH)	RESOURCES
MS. K. MURPHY)	
MS. Y. HERSCHER)	
MR. B. CAMPBELL)	MINISTRY OF ENVIRONMENT
MS. J. SEABORN)	
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MR. P.R. CASSIDY)	ASSOCIATION
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	and WINDIGO TRIBAL COUNCIL
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MS. M. SWENARCHUK)	FORESTS FOR TOMORROW
MR. R. LINDGREN)	
MR. P. SANFORD)	KIMBERLY-CLARK OF CANADA
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MR. R. BARNES)	ASSOCIATION
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MR. B. McKERCHER)	OUTFITTERS ASSOCIATION
MR. L. GREENSPOON)	NORTHWATCH
MS. B. LLOYD)	

APPEARANCES: (Cont'd)

MR. J.W. ERICKSON, Q.C.) MR. B. BABCOCK)	RED LAKE-EAR FALLS JOINT MUNICIPAL COMMITTEE
MR. D. SCOTT) MR. J.S. TAYLOR)	NORTHWESTERN ONTARIO ASSOCIATED CHAMBERS OF COMMERCE
MR. J.W. HARBELL) MR. S.M. MAKUCH)	GREAT LAKES FOREST
MR. J. EBBS	ONTARIO PROFESSIONAL FORESTERS ASSOCIATION
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MR. M. COATES	ONTARIO FORESTRY ASSOCIATION
MR. P. ODORIZZI	BEARDMORE-LAKE NIPIGON WATCHDOG SOCIETY
MR. R.L. AXFORD	CANADIAN ASSOCIATION OF SINGLE INDUSTRY TOWNS
MR. M.O. EDWARDS	FORT FRANCES CHAMBER OF COMMERCE
MR. P.D. McCUTCHEON	GEORGE NIXON

(iii)

APPEARANCES: (Cont'd)

MR. C. BRUNETTA

NORTHWESTERN ONTARIO
TOURISM ASSOCIATION

I N D E X O F P R O C E E D I N G S

<u>Witness:</u>	<u>Page No.</u>
<u>KENNETH ARMSON</u> , Resumed	12624
Continued Cross-Examination by Ms. Swenarchuk	12635
Cross-Examination by Ms. Seaborn	12711

I N D E X O F E X H I B I T S

<u>Exhibit No.</u>	<u>Description</u>	<u>Page No.</u>
424	Paper by Weetman, Foster, and Krouse.	12631
425	Article entitled: Management of Publicly Owned Forestes by Gordon Baskerville from the June, 1988 Forestry Chronicle.	12656
426	Excerpt from Red Lake Crown Management Unit management plan (Reference 3A, Panel 15).	12658
427	Two-page excerpt from the United States Code of Federal Regulations.	12703
428	Excerpt from an American Management Plan entitled: Land & Resource Management Plan, Huron- Manistee National Forests.	12705
429	Bundle of Interrogatories and Answers posed by MOE.	12709

1 ---Upon commencing at 9:15 a.m.

2 THE CHAIRMAN: Good morning. Be seated,
3 please.

4 KENNETH ARMSON, Resumed

5 MR. ARMSON: Mr. Chairman, I wonder if I
6 could respond to a question that Ms. Swenarchuk had for
7 me yesterday and I have -- she asked the basis for a
8 remark or a statement in the panel of evidence, Panel
9 9, and I would like to respond to that if I may now, or
10 would you...

11 THE CHAIRMAN: Well, it depends on Ms.
12 Swenarchuk, otherwise you can respond, I suppose, in
13 reply. I don't see any problem with that if it is
14 going to clarify something that was raised yesterday.

15 MS. SWENARCHUK: Go ahead.

16 MR. ARMSON: Well, what I am referring to
17 is the statement on page 52 of the evidence and I was
18 asked to give the basis for the statement I made
19 concerning studies of jack pine and black spruce in
20 Ontario's boreal forest, indicate that even shortening
21 rotations to 40 or 50 years will not result in nutrient
22 losses from harvesting that can be considered
23 detrimental to future forest growth.

24 And I would like to -- and I am going to
25 refer to the studies that are already either in the

1 evidence or have been referred to.

2 First of all, in the study that is
3 included in that document of evidence and on page 72 --
4 this is the Foster and Morrison study, there is a
5 statement on the right-hand column concerning the net
6 incorporation of nutrients into the organic horizons
7 and this was for a 30-year-old -- a young stand and
8 that is -- if you go to the last paragraph on the page:

9 "This suggests that a true equilibrium is
10 not reached in P. banksiana stands by age
11 30...organic matter and nutrients
12 continue to accumulate...although
13 at a reduced rate..."

14 Further up on that column...

15 MS. SWENARCHUK: Excuse me, I haven't --
16 which column?

17 MR. ARMSON: This is on the right-hand
18 column on page 70 -- I am sorry, page 71. Did I say
19 page 70, it is page 71. They are discussing the amount
20 of accumulation, then I will go to page 72 now.

21 MS. SWENARCHUK: Mm-hmm.

22 MR. ARMSON: And on the right-hand column
23 of page 72 in the second -- the first full paragraph,
24 it is the paragraph above the title Tree Harvest, it
25 says:

1 "For all elements net incorporation in
2 the trees from age 30 to 65 is very small
3 in relation to (1) the amount of
4 nutrients taken up from and returned to
5 soil by vegetation, and (2) the plant-
6 available soil nutrient reserves at age
7 30..."

8 And then it goes on and discusses it further.

9 The point I am making is that he is
10 dealing with a younger stand and he is dealing with net
11 accumulation which is very small in relation to the
12 annual recycling. That is one element that I am taking
13 from that paper.

14 And then on page 80 of the second Foster
15 and Morrison paper, in the right-hand column again and
16 down at the end of the last paragraph, and that is
17 immediately above Table 6 and he is referring there to
18 weathering and precipitation inputs and he states:

19 "Weathering and precipitation inputs
20 together are greater than an annual
21 prorated, projected nutrient loss that is
22 due to full-tree harvesting, and this
23 suggests that nutrient losses are
24 replaceable."

25 What I am suggesting is my statement is based on a

1 number of pieces of information.

2 I would then like to go to the
3 methodologies that were employed by Foster and Morrison
4 in their studies, actually also by Weetman and Webber
5 and also by Timmer et al as to how they arrived at
6 estimates.

7 In all those studies, and the Board has
8 each of those, the estimates were arrived at by
9 sampling existing stands and then estimating the dry
10 weight of the bolewood, of the branches and of the
11 foliage of those stands and then carrying out, by
12 sampling, various chemical analyses. And so an
13 estimate was arrived at of the total nutrients that
14 would be removed if those stands were -- those trees
15 were taken totally.

16 Now, if that is done, there is in fact in
17 that -- that is a conventional methodology, that will
18 always give a conservative estimate of what is removed
19 by full-tree harvesting since the very procedure is
20 measuring all that is there; whereas in full-tree
21 harvesting not everything is removed, even when the
22 total tree is cut there will be branches that will come
23 off and stems broken and foliage that will drop. So
24 the estimates are always somewhat conservative, how
25 much it is difficult to say.

1 But we do have from Timmer et al, which
2 is the document in Panel 10 evidence and I would refer
3 the Board to that Panel 10 evidence and particularly
4 page 454, and this is an interesting paper in that the
5 authors here sampled the stands but they were then able
6 to measure what was left presumably in an adjacent
7 clearcut area that had been full-tree harvested.

8 And in the last paragraph on page 454, if
9 you go to the middle of that paragraph and there are
10 two sites that are being measured here, one a so-called
11 deep black spruce condition and the other is shallow
12 and, if you will recall, the recommendations
13 specifically addressed the shallow one.

14 But in this last paragraph on page 454
15 the statement reads:

16 "The deep black spruce hardwood and
17 balsam fir sites were harvested in
18 January, February and March respectively.
19 That is, the black spruce was harvested
20 in January. These operations were
21 conducted in deep snow over frozen ground
22 and consequently caused little
23 disturbance of the humus and mineral
24 soil. The shallow soil black spruce site
25 however was harvested during mid-summer."

1 Now, if the Board will turn to Table 4 on page 459,
2 Table 4 is a measure of the logging residue left on the
3 site after full-tree harvesting and in this respect
4 this paper differs from the other ones in that there
5 were no estimates of slash derived in this fashion.

6 On the black spruce sites, which are the
7 two columns to the right of Table 4, there is a listing
8 of the amount of residue in tonnes per hectare and it
9 is broken out by stem, live branches, dead branches
10 foliage, loose bark and then there is a total.

11 I think it is of interest that on the
12 black spruce deep site - and remember these were
13 harvested in the same manner but they were harvested at
14 two different times of year - the amount of residue on
15 the deep site was 8.6 tonnes per hectare, and that is
16 broken out by the various tree component; whereas on
17 the shallow site 1.9. In other words, there is a
18 slightly more than fourfold amount of material left as
19 a result of the full-tree harvesting on the deep site
20 than the shallow site.

21 The stand characteristics for those two
22 sites are given in Table 1 on page 454 and would
23 indicate that apart from -- they are of the same age,
24 they are different -- only slightly different in
25 density, primarily different in the size of the stems

1 and the height and in the diameter which is perhaps
2 what might be expected.

3 The point I am making, Mr. Chairman, here
4 is that if I take the information that is obtained in
5 these papers with that type -- put it to together with
6 a knowledge of what happens when there is a full-tree
7 harvesting, I come to the conclusion that there -- that
8 the estimates that are arrived at have to be put in
9 that context.

10 And that is really -- when I was asked
11 the question of why would I make the statement, these
12 are the elements that go into my -- the background for
13 my making that statement.

14 There is one further paper, Mr. Chairman,
15 that I referred to but which the Board, I don't
16 believe, has as an exhibit and I believe that we have
17 copies of that. It was the review paper of 1986 that I
18 referred to and, in fact, I believe I quoted something
19 and I thought the Board should be aware of that paper
20 and there are copies here I believe.

21 THE CHAIRMAN: That is the one that he
22 undertook to produce yesterday; was it not?

23 MS. SWENARCHUK: Pardon me?

24 MR. FREIDIN: What citation is there?

25 MR. ARMSON: This is the nutrient cycling

1 and availability in forest soils.

2 MS. SWENARCHUK: All right.

3 MR. ARMSON: Foster, Weetman and Krouse
4 and I referred to it although I don't believe the Board
5 has it.

6 MR. FREIDIN: I am not sure whether you
7 want to file that or not?

8 THE CHAIRMAN: I suppose if it was
9 referred to, it should probably be filed.

10 MS. SWENARCHUK: I think it should be
11 filed. I just indicate that getting it now, if I am
12 going to come back to it at all, I will come back to it
13 in Panel 10. I am not in a position to discuss it with
14 Mr. Armson this morning.

15 THE CHAIRMAN: Okay. But it will be
16 discussed at some point. We might as well have it in
17 at this point.

18 MS. SWENARCHUK: It may be, may be.

19 THE CHAIRMAN: Exhibit 424.

20 ---EXHIBIT NO. 424: Paper by Weetman, Foster, and
21 Krouse.

22 MR. FREIDIN: Mr. Chairman, just in
23 relation to the last comment by Ms. Swenarchuk, this
24 document, although it wasn't included in the Panel 9
25 statement itself, was referenced and I appreciate Ms.

1 Swenarchuk, perhaps she hasn't reviewed this or had her
2 experts review this and may want to discuss it with
3 them, but I would respectfully request that if in fact
4 someone is being cross-examined on these articles being
5 put in through this witness, much of that
6 cross-examination should be done of Mr. Armson, if
7 possible.

8 MS. SWENARCHUK: Mr. Chairman, that
9 brings me to a point that I was going to bring to your
10 attention before I began my cross-examination and that,
11 of course, is the degree to which the issues that we
12 are discussing in Panel 9 are also going to appear in
13 Panel 10, some of them in Panel 11, and the degree to
14 which the issues from now really to Panel 14 are
15 repeated and inter-related.

16 And you indicated earlier that the Board
17 would give considerable latitude in cross-examination
18 for that reason, and I just want to put on the record
19 that I may well come back in other panels to issues
20 that have been discussed here.

21 With respect to this paper I can't tell
22 you for sure whether I am going to want to refer to it
23 again or not, but I think it falls within that general
24 context of what I was just saying.

25 THE CHAIRMAN: Well, I think the parties

1 should be aware that the Board does intend to afford a
2 fair amount of latitude between this panel and the
3 succeeding panels, at least to 14, because in the
4 Board's view there are a number of related or
5 inter-related matters.

6 What we will attempt to avoid, where
7 possible, is the necessity of having to recall
8 witnesses from another panel to come back and testify,
9 although in some cases that may in fact be necessary,
10 but as far as addressing the issues and revisiting some
11 of the issues with subsequent witnesses in subsequent
12 panels, there will be a certain amount of that and the
13 Board is prepared to allow it.

14 MR. FREIDIN: My only point is that
15 obviously the experience or the expertise of the
16 various witnesses differ, so I have no idea the degree
17 to which you want to get into any particular scientific
18 matter, and I just think that should be kept in mind
19 when the witnesses are here.

20 THE CHAIRMAN: Well, I think counsel has
21 a responsibility for all the parties to acknowledge
22 that, and when they have a witness in the box that has
23 a specific expertise, they should well consider that
24 that may be the appropriate witness to deal with a
25 particular matter, because we will not get into a

1 situation of recalling witnesses at random because,
2 otherwise, this hearing will slow down considerably and
3 I think we will all lose the orderly progression of it
4 if we proceed in that fashion.

5 MS. SWENARCHUK: It is progressing in an
6 orderly manner; is it?

7 THE CHAIRMAN: Well, we would like to
8 think it is. Maybe we are suffering under some
9 illusion, but we like to think that in any event.

10 MS. SWENARCHUK: Perhaps I could just
11 clarify another matter while we are on this subject
12 and; that is, Mr. Armson has testified to parts of the
13 witness statement of Panel 10. Is it Mr. Freidin's
14 intention that any witnesses on the Panel 10 panel will
15 deal with these same portions at all and/or have, shall
16 we say, equivalent expertise to Mr. Armson on these
17 matters?

18 MR. FREIDIN: In response to the
19 expertise of Mr. Armson, Mr. Greenwood in fact will be
20 on Panel No. 10 and can speak to some of these matters.
21 He will probably be the person to whom questions
22 related to this area should be put.

23 THE CHAIRMAN: But it is not your
24 intention to repeat what was taken out of 10 and put
25 into 9.

1 MR. FRIEDIN: Exactly.

2 THE CHAIRMAN: Because I thought the
3 intention was a net saving.

4 MR. FREIDIN: That is correct, I have no
5 intention of doing that.

6 CONTINUED CROSS-EXAMINATION BY MS. SWENARCHUK:

7 Q. Well, just picking up from the
8 subject you have introduced this morning, Mr. Armson,
9 can you tell me what is the usual rotation or range of
10 rotation periods used for black spruce in the boreal
11 forest?

12 A. 80 to a hundred years would be the
13 usual.

14 Q. And jack pine?

15 A. 70 would probably be -- it might be
16 as low as 60, but I would say 70 and 80. It will
17 depend on the particular conditions.

18 Q. All right. So just so that we are
19 clear, these then are the rotation periods that the
20 Ministry is utilizing in its management plans and, for
21 example, in its forecast of future wood supply?

22 A. That is correct.

23 Q. Now, I would like to go back to
24 approximately where we left off yesterday which was
25 with the discussion of fragile sites and full-tree

1 logging and we noted as you went through the paper the
2 concerns of the author that after full-tree logging
3 rapid revegetation is required to minimize leaching of
4 nutrients.

5 A. Yes, they make this point.

6 Q. Now, if we have a situation where the
7 revegetation has been inhibited by herbicide use and
8 the area has been planted --

9 A. Yes, you are saying that the area is
10 herbicided before it is planted?

11 Q. Right.

12 A. Yes.

13 Q. Presumably then the vegetation has
14 been -- or the revegetation has been reduced?

15 A. It has been reduced, yes.

16 Q. And the seedlings, as I understand,
17 are normally planted about two metres by two metres
18 apart?

19 A. That is rough spacing, yes.

20 Q. And they are pretty small?

21 A. Yes, they are small.

22 Q. So the root systems are not very
23 developed?

24 A. That's correct.

25 Q. And they absorb relatively few

1 nutrients at that stage?

2 A. Yes.

3 Q. So presumably more leaching of
4 nutrients is possible in that situation than if rapid
5 revegetation was not inhibited?

6 A. It is possible. There are many
7 factors that will affect it, but it is possible, yes.

8 Q. But is it not also common that there
9 is a delay between the harvest which may occur one
10 year, the site preparation which may occur the next
11 year, and the planting which may occur the third year?

12 A. There may be a delay, that is
13 correct.

14 Q. In which case as well there would be
15 less vegetation on the site than if, for example, the
16 planting was immediately afterwards?

17 A. That would depend very much on the
18 season and, of course, herbiciding isn't done always
19 right after planting--

20 Q. Mm-hmm.

21 A. --or after harvesting.

22 Q. It is the case, however; is it not,
23 that there is frequently a delay between the harvest
24 and the replanting?

25 A. Yes, quite -- usually there is a

1 delay based on the -- if there is planting, there is
2 site preparation and that may take -- depending on when
3 the harvesting is done, there may be one full season
4 interlude.

5 Q. Right. Now, we also saw in these
6 articles concern about erosion of nutrients.

7 A. Erosion was mentioned, but -- if you
8 would refer me to the specific -- I don't think erosion
9 was highlighted in all of them.

10 Q. It wasn't highlighted, it was
11 mentioned and then if you will recall I referred you to
12 the Weetman inclusion in Panel 10 which also talked
13 about the possibility of erosion.

14 A. Yes, the general Weetman study, that
15 is, that dealt with the broad --

16 Q. That's right.

17 A. Yes, and as I believe I indicated,
18 there are some very general statements there.

19 Q. Right. In my view, Mr. Armson, you
20 made some general statements last week too and I would
21 like to come back to those.

22 A. Yes.

23 Q. And essentially, if I understand you
24 correctly, you don't consider that erosion is a serious
25 problem even on, for example, bedrock sites; erosion of

1 nutrients?

2 A. Erosion on bedrock sites, and here I
3 would suggest that where there is an organic mat,
4 primarily of mosses that can dry out that can erode,
5 that is a very clear type of situation.

6 Q. All right. And with regard to trees
7 that exist I guess in fissured bedrock on, I think you
8 said the organic matter of their ancestors, presumably
9 it has taken a long time for that matter to accumulate;
10 has it not?

11 A. I would assume it has taken many
12 generations of trees.

13 Q. And, therefore, erosion of that
14 matter would be serious in the sense that it would
15 probably take a long time for it to be replaced?

16 A. Well, in looking in those fissures
17 cracks I have seen no evidence of erosion, it is pretty
18 well held in there. I am unclear where it would erode
19 to.

20 Q. Well, is it not possible that some of
21 it could be washed off the rocks--

22 A. No.

23 Q. --by sufficiently strong rain, for
24 example?

25 A. Well, no, the...

1 Q. And other forces.

2 A. The material I am referring to that
3 is rooted by the existing stands is decayed organic
4 material that is -- from roots that have been in there
5 and it is really held within there, both in a
6 horizontal or vertical position and it is just trapped
7 in there. I haven't seen evidence of eroding from that
8 situation.

9 Q. Okay.

10 MS. SWENARCHUK: Mr. Chairman, I want to
11 refer to a number of our interrogatories on Panel 10
12 which I have not had prepared for you for filing, but I
13 think that the section I want to refer to I can just
14 briefly read, if that is acceptable.

15 And if you wish I can provide the...

16 THE CHAIRMAN: Are you going to deal with
17 all the interrogatories at one time, like right now?

18 MS. SWENARCHUK: Yes, there are just two
19 of them.

20 THE CHAIRMAN: Oh, there is only two of
21 them. Okay, well then -- I guess other counsel won't
22 have the opportunity of following along with their
23 copies as well.

24 Are they aware of the ones you are going
25 to be referring to?

1 MS. SWENARCHUK: No, no, they are not. I
2 can simply wait and file this in Panel 10.

3 THE CHAIRMAN: Okay, why don't we do
4 that. It makes it easier I think for both the Board
5 and the other parties to follow along.

6 MS. SWENARCHUK: Yes. Probably deal with
7 all of them in Panel 10.

8 Q. Would you be able to estimate, Mr.
9 Armson, what proportion of the area of the undertaking
10 in your view would constitute fragile sites?

11 A. No.

12 Q. Would you be able to estimate what
13 proportion constitutes what you would describe as
14 shallow sites?

15 A. No.

16 Q. Can you expand on that?

17 A. Well, in response to the first
18 question, fragile, as I think I indicated before,
19 should have some definition. And in terms of shallow,
20 again, some values.

21 Shallow could mean anything less than 10
22 centimetres, less than 20 centimetres and on top of
23 that knowing the variability even in areas of what we
24 might call generally shallow soils, let's say,
25 something less than 20 centimetres, there can be

1 considerable variation in the nature of that
2 shallowness in terms of whether it is interspersed,
3 whether it is on a solid bedrock, whether it is on a
4 fractured bedrock and so on. Those are the factors.

5 Q. Okay. Let's go at it this way,
6 because this was my next question. You tell us -- you
7 have said on page 14 that a definition of fragile
8 sites, therefore, only has meaning when placed in the
9 context of time and values. That is the last line on
10 page 14.

11 Could you indicate for us what you
12 consider to be shallow, fragile, infertile sites as you
13 would define them?

14 A. Well, I wouldn't define them as
15 fragile or shallow in the general sense. A site, if
16 you will, if it supported a commercially harvestable
17 stand, and I will give that because there are many
18 areas of bedrock with nothing but moss on it and so on.
19 But I will confine my remarks, I assume you are
20 referring to a forested area?

21 Q. Yes.

22 A. Okay. Then two factors I would look
23 at would be, first of all, the general pattern of depth
24 of the materials and that in relation to the nature of
25 the bedrock, whether it were essentially a solid

1 undulating bedrock, which is the type of condition we
2 have, or whether it would be a fractured bedrock.
3 Those would be conditions that I would look to.

4 If it were a shallow, given the same
5 order of magnitude of depth and it were on a firm,
6 solid bedrock with very little fracturing, then I would
7 immediately flag it as a situation that I would
8 consider to be taken into account to a greater degree
9 in terms of the harvesting, the time of harvesting and
10 the nature of any activity there compared to a
11 fractured bedrock.

12 I would also take into account the
13 species I was concerned with. If it were a species
14 which exploits, has a deep rooting as I indicated
15 earlier with white pine and to a large degree with jack
16 pine, I would have much less concern than if it were
17 with a species which is tradition -- is typically much
18 more shallow rooting and we know would not be able to
19 even utilize some of the fracture.

20 So I would really categorize it in terms
21 of my looking at that situation in a given context.

22 Q. Any other considerations?

23 A. Well, the nature of the stand, the
24 pattern, if you will, of the soils and the bedrock.
25 Those would be -- and then, obviously, in terms of the

1 soil I am looking at the existing forest floor and the
2 history that that stand has had to the best that I can
3 arrive at a decision on it.

4 Q. So you would agree that it is not
5 unreasonable to describe those types of sites as
6 fragile sites?

7 A. Well, I wouldn't use the word -- I
8 think I made it clear, the word fragile, I just
9 wouldn't use. Other people may use it, but I wouldn't
10 use it.

11 Q. But you are not able to offer any
12 indication of what proportion of the land base may
13 consist of the types of sites you just described?

14 A. No, I can't offer that, not for the
15 area of the undertaking.

16 Q. Okay. How do the economics of
17 full-tree harvesting compare with the economics of
18 conventional harvesting; is it less expensive?

19 A. I can't tell you what the economics
20 are.

21 Q. It is more highly mechanized; is it
22 not?

23 A. Well, both conventional or
24 tree-length and full-tree harvesting are mechanized.
25 The economics of the machinery used I can't speak to,

1 someone more competent will do that.

2 The observation I would have is that in
3 full-tree harvesting there is -- because of the nature,
4 there is usually a higher degree of utilization of the
5 bole, but that is a general observation.

6 Q. Is it not also less labour intensive?

7 A. I can't speak to the amount of labour
8 involved.

9 Q. In the studies that we have referred
10 to, the authors have been - aside from the shallow site
11 situation - they have been optimistic about the
12 nutrient availability for a second rotation.

13 A. Yes, I would say that.

14 Q. They have not ventured any comments
15 about rotation subsequent to that, or any possibility
16 of eventual long-term deterioration of nutrient
17 availability--

18 A. No, they have not.

19 Q. --with repeated croppings?

20 A. No, they have not.

21 Q. Would it be your position and the
22 Ministry's position that sustained yield is achieved
23 through the ability to produce a second rotation only?

24 A. Yes. The definition of sustained
25 yield is that which can be taken or depleted in

1 relation to that which is growing there and we are
2 using that definition.

3 And there is no -- as I have indicated,
4 there is no indication that the second stand, however
5 developed, is less productive. It may be a different
6 species but, in general, there is no indication that
7 the harvesting has resulted in less growth to be used.

8 THE CHAIRMAN: No, but isn't Ms.
9 Swenarchuk asking whether or not the definition of
10 sustained yield goes beyond the second generation?

11 MR. ARMSON: Well, the definition of
12 sustained yield doesn't deal in rotation length per se,
13 at all.

14 THE CHAIRMAN: So is it unlimited?

15 MR. ARMSON: Yes. The definition that we
16 use and which is in the legislation, and it is a
17 commonly accepted one, is that it is depleting the
18 forest in relation to that which is growing there.
19 That is the definition.

20 There is maybe implicit in that that it
21 is a continuing, but it is not implicit that it is the
22 same amount and it can vary obviously in relation to
23 the nature of the forest.

24 MS. SWENARCHUK: Q. And I am simply
25 underlining, Mr. Armson, that when we are talking about

1 nutrient available and sustained yield harvesting, we
2 have to be concerned with more than just the second
3 rotation.

4 Essentially, surely the position is that
5 in order to satisfy a requirement for sustained yield
6 we must be capable of an infinite number of rotations
7 in harvesting?

8 A. That is correct.

9 Q. Can you look at page 56 of Panel 9,
10 Table 13?

11 A. Yes, I have that.

12 Q. Now, in your discussion of this
13 figure and the possible levels of change resulting from
14 timber management activity, you did not specify the
15 type of management activity or impact or differences in
16 sites, you haven't related these graphs to anything
17 identifiable and concrete.

18 Is it your position that all effects of
19 all disturbance follow this ground?

20 A. No. The graph is purely hypothetical
21 and it was to portray to the Board a perception or
22 concept of changes in values and, as I indicated in the
23 evidence, these could mean any number of different
24 attributes, but in relation to time and in relation
25 to -- in terms of this graph a given, although

1 hypothetical, change in relation to a natural
2 disturbance whatever that may be. There are many
3 different kinds.

4 It was really to present the idea that in
5 terms of comparison between a disturbance caused by
6 man, whatever that may be, or one caused by nature,
7 there are a series of time-related measurements, if you
8 will, and that this is all this graph is portraying.

9 Q. Right. And this is not an attempt to
10 state anything about, for example, the time required to
11 recover from a natural versus a human disturbance?

12 A. Not at all.

13 Q. Right. Now, there was some
14 discussion between you and the Chairman yesterday along
15 the lines that over time all the values of the forest
16 will recuperate whatever we do and that it is a
17 question of the timeframe that we look at.

18 Now, would you agree that if the
19 timeframe is long enough to recover from a certain
20 disturbance that it could be impossible to meet the
21 sustained yield orientation of the Ministry; that is,
22 if the forest takes long enough to recover there could
23 be a hiatus in wood supply a particular site or area?

24 A. The time for a stand to reach a
25 condition that it can be harvested, it will, yes, vary

1 and, therefore the longer the time - and we set
2 rotation ages in relation to a number of factors - the
3 longer the time, then in fact by simple arithmetic the
4 greater the area you would have to have to sustain
5 given supply, given growth, that's correct.

6 Q. Right. And the timeframe of recovery
7 will also influence providing non-timber values from
8 the forest such as wildlife, recreation, aesthetic
9 values?

10 A. Yes, the time for change - I wouldn't
11 use the word recovery - it is a change that is coming
12 about in that forest.

13 Q. Well if, for example, a given
14 disturbance has the effect of, for example, reducing
15 habitat for a given wildlife so that the population of
16 the wildlife decreases for a certain time period -
17 whether we want to use the word recover or anything
18 else - presumably until that forest has returned to a
19 particular state, that wildlife habitat may continue to
20 be affected and the wildlife population may continue to
21 be lower?

22 A. The forest will go through various
23 stages of development, but I guess the reason, perhaps
24 I am qualifying it, if I might explain, because whether
25 you have a disturbance natural or otherwise the stand

1 that is disturbed by fire or by man may come back to
2 not the same kind of stand, it may come back to another
3 kind of stand depending on a whole variety of
4 circumstances.

5 So recovery is why I wouldn't use the
6 word recovery, it may come back. If it were an area
7 that was burnt, it may come back to more poplar than it
8 was jack pine or something because of the timing or
9 whatever and, therefore, it will come back to maybe a
10 different forest condition, and that may have effects
11 in terms of other organisms and so on.

12 It isn't a straight line, if you follow
13 me, in terms of recovery.

14 Q. No, I quite agree it is not a
15 straight line. I am merely pointing out that surely
16 timeframe is crucial in assessing the impact of the
17 disturbance?

18 A. The timeframe is very important, yes.

19 Q. And some values could be permanently
20 affected; could they not, for example, the type of
21 values that Mr. Beechey testified to as being protected
22 through the ANSI program, values for scientific study
23 or value of a particular natural heritage example,
24 could be impacted, whether by human disturbance or
25 natural disturbance to the effect of being permanently

1 destroyed?

2 A. That's correct.

3 Q. I would like you to turn now to page
4 12 of Panel 9, Mr. Armson, and the last line of the
5 first paragraph:

6 "Where man has intervened, particularly
7 by harvesting the resultant forest the,
8 results have most often been similar to
9 those resulting from natural forces."

10 Now, similar in what way, Mr. Armson?

11 A. Similar in that the forest that is
12 reviewed and seen after the impact of man in terms of
13 just harvesting, then we see very similar forests to
14 those that are there already naturally or which were
15 there before harvest.

16 Q. I want to put to you a sentence by
17 Dr. Baskerville, Mr. Armson, contained in an article
18 entitled: Management of Publicly Owned Forests, from
19 the Forestry Chronicle.

20 I don't think it is necessary to make the
21 entire article an exhibit.

22 MR. FREIDIN: Can you give me the
23 citation?

24 MS. SWENARCHUK: It is June, '88,
25 Forestry Chronicle.

1 Q. Mr. Armson says this:
2 "History shows that 'resource
3 development' really means development of
4 a local economy based on exploitation of
5 a publicly owned resource. The result is
6 the paradox of resource development
7 leading to degradation of the resource.
8 Two recent international conferences on
9 the subject of sustainable development
10 indicate this is a world-wide problem.
11 With the public appetite for economic
12 development or perhaps more correctly for
13 the benefits purchased with the revenues
14 from development, the result is
15 incremental additions of resource
16 development until the resource cannot
17 support the use and becomes degraded. In
18 the case of Canadian public forests this
19 is most easily seen in the decline in the
20 quality of raw material in terms of
21 species and size taken from the forests
22 as industry has been expanded over the
23 last century or, more particularly, over
24 the last 40 years."

25 THE CHAIRMAN: Ms. Swenarchuk, I think

1 that quotation--

2 MS. SWENARCHUK: You want it in.

3 THE CHAIRMAN: --is sufficiently long
4 enough and complicated enough that we should have it
5 before us. And the parties as well, as well as Mr.
6 Armson, should properly have that before them too.

7 MS. SWENARCHUK: Do you want it copied
8 now? I may have the same problem, it has been
9 highlighted and I am not sure how clear this is going
10 to come through.

11 THE CHAIRMAN: You want to deal with this
12 now?

13 MS. SWENARCHUK: I really want to simply
14 ask Mr. Armson if he agrees with the last part of this
15 quotation which is:

16 "...that there has been a decline in the
17 quality of raw material in terms of
18 species and size taken from the
19 forests...over the last 40 years."

20 MR. ARMSON: As a categorical statement,
21 I cannot agree. There are species locations where that
22 is true.

23 MS. SWENARCHUK: That was as far as I was
24 trying to go with this.

25 THE CHAIRMAN: Is that as far as you are

1 going to go with that?

2 MS. SWENARCHUK: Mm-hmm.

3 THE CHAIRMAN: Okay. I think at this
4 time -- perhaps you might want to produce the article
5 for the benefit of the parties and why don't we give it
6 an exhibit number at this time--

7 MS. SWENARCHUK: All right.

8 THE CHAIRMAN: --and then you can just
9 move on.

10 MR. COSMAN: Mr. Chairman, it is always
11 helpful. as you have pointed out, to see the context in
12 which a statement is made. Whether it is made an
13 exhibit or not is another issue, I leave it entirely to
14 the Board -- or I think it is up to to Ms. Swenarchuk
15 if she wants to make it an exhibit.

16 THE CHAIRMAN: Well, you read out the
17 paragraph and Mr. Armson answered a specific question
18 based on part of that paragraph and perhaps it would be
19 best for the Board and the parties to have the whole
20 article in front of them even though you are not going
21 to go on any further..

22 MS.SWENARCHUK: I don't object. The rest
23 of the article has to do with Mr. Baskerville's
24 proposals and further discussion of public policy in
25 Canada regarding forests.

1 We are talking here about a proposition
2 that human intervention has, as Mr. Armson defined it,
3 resulted in a forest similar to that that was there
4 before. And I think obviously Mr. Baskerville doesn't
5 agree with that.

6 THE CHAIRMAN: And Mr. Armson doesn't
7 agree necessarily with Mr. Baskerville.

8 MS. SWENARCHUK: Right.

9 THE CHAIRMAN: Dean Baskerville.

10 MR. FREIDIN: That was the sole purpose
11 for which you were bringing that document, I take it?

12 MS. SWENARCHUK: That's right.

13 THE CHAIRMAN: All right. Why don't we
14 give it an exhibit number, Exhibit 425, and if you
15 could produce it at some point over the next short
16 time.

17 MS. SWENARCHUK: I think I should go back
18 and get a clean copy, this may not copy good.

19 THE CHAIRMAN: At some point in time, if
20 we could just -- could we have a title for it so we can
21 mark it as an exhibit.

22 MS. SWENARCHUK: It is entitled:
23 Management of Publicly Owned Forests by Gordon
24 Baskerville and it is from the June, 1988 Forestry
25 Chronicle.

1 ---EXHIBIT NO. 425: Article entitled: Management of
Publicly Owned Forests by Gordon
2 Baskerville from the June, 1988
Forestry Chronicle.

4 MS. SWENARCHUK: Q. Mr. Armson, would
5 you agree that human intervention has resulted in
6 species change in the forest in the area of the
7 undertaking?

8 A. Yes.

9 Q. And that there has been a decline in
10 the availability of certain species, for example, white
11 pine for industry purposes?

12 A. There has been a decline in the
13 production -- industrial production of white pine, yes.

14 Q. And would you agree that with regard
15 to the species hemlock, that it was at one time a
16 fairly predominant coniferous species in the Great
17 Lakes/St. Lawrence Forest and it was largely liquidated
18 between 1880 and 1920 and now is not a common species
19 in those forests?

20 A. I would disagree.

21 Q. Would you care to expand?

22 A. Yes, hemlock is a very common species
23 in the part of the Great Lakes/St. Lawrence region.

24 Q. In part of the region?

25 A. Yes, particularly in the part that is

1 south -- the main part of the province south of the
2 border. I am not referring to the northwestern part of
3 The great Lakes/St. Lawrence region, but I am speaking
4 here primarily of the area south of the undertaking in
5 the Great Lakes/St. Lawrence Forest and, more
6 particularly, that in the area of the undertaking in
7 the Algonquin and to the south half of our northeastern
8 administrative regions.

9 Q. Algonquin and southeastern region;
10 did you say?

11 A. No, the Algonquin region--

12 Q. Yes.

13 A. --within the area of the undertaking
14 and the southern part of the northeastern region, the
15 administrative region which is within the area of the
16 undertaking. In other words, that part of the Great
17 Lakes/St. Lawrence that lies there.

18 Q. Now, I have here an excerpt from the
19 Red Lake Crown Management unit management plan which
20 filed as part of Panel 15.

21 And would you agree, first of all, that
22 both balsam fir and hardwoods have increased in
23 proportion in the boreal forest during the time of
24 human forest?

25 A. I honestly can't answer that one. I

1 don't know whether it has increased or decreased or
2 whether it remains the same since the intervention of
3 man because we don't have any records -- quantifiable
4 records such as we have now through the present forest
5 resources inventory.

6 Q. All right. Well, we will look at
7 this exhibit then.

8 MS. SWENARCHUK: Mr. Chairman,
9 Exhibit...?

10 THE CHAIRMAN: 426.

11 MS. SWENARCHUK: I only have two left,
12 Mr. Chairman.

13 THE CHAIRMAN: Okay.

14 ---EXHIBIT NO. 426: Excerpt from Red Lake Crown
15 Management Unit management plan.
(Reference 3A, Panel 15)

16 MS. SWENARCHUK: Q. Now, as I say, this
17 is an excerpt from Reference 3A of Panel 15 and it is
18 the management plan for the Red Lake Crown Management
19 Unit and we note in paragraph 2:

20 "The past forest operations have promoted
21 the growth of both balsam fir and
22 hardwoods. This was the direct result of
23 past highgrading operations for sawlog
24 material. This type of operation was
25 prevalent on most of the major lakes

1 particularly in the Red Lake drainage
2 system..." et cetera.

3 Do you agree that this is an example, according to the
4 writers of the plan, where past harvest operations have
5 resulted in increased balsam fir and hardwoods?

6 A. I accept that statement by the
7 forester made.

8 Q. Okay. Now, if we could look at the
9 Weetman article in Panel 10, Volume I at page 340 and I
10 am looking at the third paragraph of the text, about
11 halfway down it begins:

12 "As aspen and birch are not suitable for
13 river movement because of sinkage and
14 of less value for pulp, these species
15 have traditionally been left uncut in
16 pulpwood operations. This has led to the
17 conversion of stands from softwoods to
18 mixed woods over large areas of boreal
19 forest. From the viewpoint of economics
20 and future wood supply, this has been a
21 negative stress and a cause of much
22 concern."

23 Would you agree with that statement?

24 A. I think it is generally, true, yes.

25 Q. And to continue, the last line of

1 that paragraph:

2 "The boreal mixed wood forest is thus a
3 successional mosaic of stratified stands
4 where cutting has favoured hardwood
5 reproduction over softwoods."

6 A. Well, much of the boreal forest in
7 this province has not been cut.

8 Q. He is referring to the area that has
9 been cut.

10 A. No, he refers to the boreal mixed
11 wood forest is a successional one where cutting is
12 favoured. So it is only where it is cut.

13 Q. Yes, agreed.

14 A. That's right. Much of the boreal
15 forest has not been cut.

16 Q. We are talking here about the impact
17 of human disturbance, Mr. Armson, and I am simply
18 continuing to deal with the question of stand
19 conversion and the increase in hardwood components in
20 our forest related to human disturbance?

21 A. Yes, and I have indicated, I agree
22 with the statement there.

23 Q. Right. If we could go on to the next
24 paragraph.

25 "There has been relatively little

1 reforestation on the annual cut-over of
2 about 500,000 hectares in this
3 region...."

4 Which I believe is Ontario and Quebec, Canadian Shield
5 Forests, Quebec -- no, I am sorry. Okay.

6 Let's move to the next part of the
7 paragraph and I will see if you agree with this
8 conclusion about that area.

9 "Softwood growth has often been slow to
10 establish even in size and often covered
11 by brush. The succession and dynamics of
12 fire-origin forest to which the tree
13 species are adapted by the presence of
14 full or partially serotinous cones in
15 jack pine and black spruce are not the
16 same after logging."

17 Do you agree with that statement?

18 A. Not completely, and I am speaking
19 here from the standpoint of, first of all, in the area
20 of the undertaking here in Ontario there is a
21 considerable amount of silviculture under timber
22 management directed towards the regeneration of jack
23 pine and black spruce and he is making a very general
24 statement and I would like to have it put in the
25 context of what we are doing here. And secondly...

1 Q. Is says Quebec west to Saskatchewan,
2 so it includes Ontario?

3 A. Yes, and that's why I want to make it
4 clear that one would have to relate that to the Ontario
5 situation very specifically. He is taking a broader
6 look at it.

7 Q. He hasn't seen fit to single out
8 Ontario and indicate that it is in a different
9 situation than the other areas he's describeing, but
10 you disagree with that characterization on his part; do
11 you?

12 A. No, I wouldn't say -- I would say it
13 relates to certain conditions and, again, it is a very
14 general statement and I would not in fact agree with it
15 as relating to every area we're dealing with and
16 certainly within Ontario I think there may be
17 exceptions.

18 Q. Would you agree that the succession
19 and dynamics of fire-origin forests to which the tree
20 species are adapted, particularly adapted, are not the
21 same after logging; the succession that one should
22 expect after logging is not necessarily the same as one
23 would expect after fire?

24 A. The dynamics are somewhat different,
25 yes. The succession may or may not be the same

1 depending on the particular situation.

2 Q. Maybe you could expand on that?

3 A. Well, there are certain kinds of jack
4 pine forests where following harvesting the dynamics
5 can be similar, though not the same, but where the
6 succession can be in fact very similar if not the same.

7 Jack pine stands that are harvested such
8 that the cones - and I am speaking of situations where
9 there is no particular site preparation even - there
10 can be instances, particularly in shallow soils I might
11 at add, where the cones on the ground will open as a
12 result of the heat, the seedlings will germinate and in
13 fact there will be a second jack pine stand there and
14 the succession move very similar, if not virtually the
15 same, as if it had been an area that was burned.

16 Q. Is it your opinion that that is the
17 normal course, or is it more normal to have an
18 increasing number of hardwoods after harvest?

19 A. The normal course in the harvesting
20 of the boreal forest, particularly mixed wood stands,
21 is for the greater proportion of hardwoods, yes.

22 Q. Okay. Now, if we look...

23 MR. MARTEL: Can I ask a question. Is
24 that from purely natural regeneration as opposed to
25 scarification then...

1 MR. ARMSON: That's correct. The
2 question was harvesting only and I am not including
3 areas where there is a subsequent treatment for
4 artificial regeneration, but Ms. Swenarchuk asked about
5 harvesting and I answered, with no further treatment.

6 MS. SWENARCHUK: Q. Now, if you can turn
7 to the following page, 341. Just following up on your
8 last point, Mr. Armson, then: Would you agree with
9 with me that the degree to which we can expect to
10 obtain coniferous forest after harvest in the boreal is
11 directly related to the success of the artificial
12 regeneration programs at this time?

13 A. No, I don't agree. It is related to
14 that and also to the manner in which the silvicultural
15 practices involved both including harvesting and
16 subsequent treatment. So there may not be any
17 artificial regeneration necessarily involved.

18 Q. Now, if it is common that following
19 harvest without - if Mr. Weetman is right, that harvest
20 does not normally result in the same post-logging
21 natural regeneration as fire with regard to jack pine,
22 then are we not relatively dependent on some form of
23 artificial regeneration in order to arrive at the same
24 proportion of coniferous content as would have
25 regenerated after fire?

1 A. Let me ask see if I can answer the
2 question this way: The replacing of an existing
3 coniferous stand by a second coniferous stand or by
4 essentially a stand with more hardwoods, which is what
5 we are talking about here, the replacement of the
6 coniferous stand can come about either by the
7 harvesting system in a particular situation or it can
8 come about as a result of harvesting followed by
9 treatments which may necessitate artificial or they may
10 not.

11 But where there is a directed set of
12 activities towards that objective of maintaining the
13 coniferous component, then we are into a managed state.
14 I would suggest that much of Dr. Weetman's comments
15 here are related to the historical harvesting of the
16 forest much of which was done without those objectives
17 being in place. And he is quite right, that many of
18 those stands reverted to a higher proportion of
19 hardwoods and less softwood.

20 We still have stands in this province
21 under management where we have difficulty in replacing
22 the coniferous component because of the -- just the
23 dynamics, if you will, of the situation, and we agree
24 to that.

25 Q. Well, let me phrase my question more

1 generally then. Given this tendency following harvest
2 alone of a coniferous stand to regenerate with a higher
3 proportion of hardwood, then maintaining the coniferous
4 content surely depends upon the success of the forest
5 management activities overall?

6 A. Yes.

7 Q. Now, looking at another effect of
8 human disturbance. If you look at page 341, the second
9 paragraph on the left-hand column:

10 "The changes from fire removal to human
11 removal of mature timber plus the
12 increasing areas of young forest created
13 by man has dramatically changed the
14 ungulate population in the boreal forest.
15 White-tailed deer have expanded their
16 range northwards, caribou have retreated
17 northwards and moose populations have
18 increased."

19 Would you agree that that's another human impact
20 which -- another impact which he is attributing to
21 human disturbance and which he presumably would not
22 expect after fire disturbance?

23 A. Well, fire could change the nature of
24 the forest. I believe the statement is generally true,
25 I accept it.

1 Q. Before we go any further I asked you
2 yesterday if you would identify for us how black spruce
3 and jack pine are adapted to regeneration after
4 clearcutting and you gave us a summary of their, shall
5 I say, regeneration strategies, but it was not clear to
6 me from that how specifically you consider that to
7 adapt them well to regeneration after clearcutting.

8 Could you focus on that issue?

9 A. Well, I guess the key feature, and
10 perhaps it was so obvious I failed to mention it, was
11 that as a result of them being a species which are
12 adapted to a major natural disturbance, fire in this
13 case - I believe you indicated that - they are species
14 which grow in even-aged stands and when one clearcuts,
15 harvesting, usually the objective is to establish a new
16 stand on an even-aged basis. So that is one very prime
17 attribute that I would suggest is relevant.

18 Q. Are you saying that clearcutting then
19 encourages the growth of an even-aged stand;
20 clearcutting per say.

21 A. Clearcutting is a silvicultural
22 system used particularly with those species that are
23 adapted to being grown in an even-aged stand.

24 Q. Okay. You would agree, would you
25 not, that there are certain differences between the

1 effects of fire on a stand and the effects of logging?

2 A. Oh yes, I do agree.

3 Q. And perhaps we can just attempt to
4 get a summary of that by looking at page 352 of Weetman
5 under the title of Harvesting and Regeneration.

6 He again dealt with the regeneration
7 problem and then says, beginning about halfway down the
8 paragraph:

9 "Biologically..." this regeneration
10 problem "...is usually centered on the
11 differences between a fire or insect
12 disturbance (to which the trees are
13 adapted) and a logging disturbance.
14 Logging often does not create good
15 seedbeds for new generation, due to lack
16 of exposure of mineral soil. Mineral
17 soil is better seedbed than the litter
18 layer, which tends to dry out. Logging
19 may remove seed sources or not provide
20 for release of seed from serotinous cones
21 (as in jack and lodgepole pine)..."

22 And we could add black spruce to that; can we not:

23 "...which need heat to break the resin
24 bonds on the cone scales. Logging may
25 not remove vegetative competition on rich

1 sites or it may destroy established
2 seedlings (advance growth) present before
3 logging. Logging may leave residual trees
4 that are of unwanted species (such as
5 poplars) or of poor form, which
6 subsequently dominate the new stand."

7 So would you agree with that description of some of the
8 differences between harvest and fire?

9 A. He is very specifically referring to
10 logging and not timber management and he goes on to
11 state in the next line:

12 "Silvicultural prescriptions to remedy
13 these situations are site specific..."

14 And it is the purpose of those prescriptions, in fact,
15 to create within the site in terms of seedbed, in terms
16 of seed either from existing cones or other cones to
17 create something that parallels, if you will, more of
18 the condition after fire.

19 Q. Yes and I am not arguing that he is
20 focusing on logging here, but I think it is important
21 for us to be aware of the differences between fire as a
22 disturbance to which the species are adapted and
23 harvest.

24 Now, would you agree then that the
25 serotinous cones of the jack pine and black spruce

1 require high temperatures in order to open and release
2 their seeds?

3 A. The jack pine particularly.

4 Q. Yes. And clearcutting does not,
5 unlike fire, provide that high temperature and further,
6 particularly with whole-tree logging, removes many of
7 the cones and seeds from the site?

8 A. It may.

9 Q. And would you agree that fire
10 concentrates the nutrients in soluble form in the ash
11 making them available for regeneration while
12 clearcutting has no similar effect?

13 A. There is somewhat of an analagous
14 situation, as I indicated, in that following
15 clearcutting with the exposure to solar radiation, to
16 precipitation, there is usually a decomposition of the
17 existing forest floor and a slow release which is not
18 the same, but it has somewhat of the same result.

19 Q. But it takes place over a longer time
20 period?

21 A. Yes, although it occurs very quickly,
22 usually the first season following logging.

23 Q. Do you agree that the variation in
24 temperatures on the sites after clearcutting and fire
25 can be extreme on the site?

1 A. Yes. In both instances, yes.

2 Q. And that the temperature of the site
3 after disturbance is important for regeneration?

4 A. In terms of natural regeneration?

5 Q. Both types of regeneration.

6 A. It can be. Not necessarily so, but
7 it can be.

8 Q. So you do not consider micro-climate
9 to be an important element in regeneration?

10 A. I didn't say that.

11 Q. Would you expand?

12 A. Yes. The temperature, depending on
13 the degree of exposure, particularly of the soil
14 surface, can be important. As I indicated, a cone,
15 jack pine cone which requires a considerable
16 temperature, if it is lying on the surface of organic
17 material normally will not -- not even in a clearcut,
18 will not reach those temperatures because of the nature
19 of the material.

20 If it is sitting on mineral soil, the
21 soil gets much hotter and the cone may open. So there
22 is -- if you were relying on temperature, there would
23 be an example.

24 If one were planting seedlings in an
25 area, planting them in the ground, the temperature may

1 or may not be of any relevance, that is the soil
2 surface temperature if you were planting.

3 You referred to micro-climate. One could
4 then deal with the air temperature above it, and I am
5 not sure whether you want to discuss that, but there
6 are variations in air temperature that can occur in
7 openings of different sizes and particularly openings
8 after either fire or harvesting.

9 Q. Well, is it your evidence that the
10 temperature on the site is not important in terms of
11 survival and growth of planted seedlings?

12 A. No, I didn't say it wasn't important,
13 it may not be a critical factor. It may -- in terms of
14 establishing a planted tree, that may not be a critical
15 factor.

16 Q. Are we to conclude then that
17 seedlings can grow in any temperature?

18 A. No.

19 Q. Surely it is an important factor.

20 A. It is a factor, but you are asking me
21 if it is the crucial factor and it will depend on the
22 nature and type of regeneration, for example, that you
23 are looking for. If, for example...

24 Q. Well, I don't think I used the word
25 critical, I merely wanted to establish the principle

1 that the temperature of the site after disturbance,
2 whether fire or harvest, is important for regeneration,
3 whether natural or artificial.

4 A. It is important.

5 Q. All right. Now, would you agree that
6 after a wild fire, since there are charred trees and
7 unburnt patches remaining, there is a partial shading
8 of the soil and the moisture in it and some regulation
9 of the temperature of the area?

10 A. There can be partial shading, yes.

11 Q. But after clearcutting we don't
12 normally have these scattered charred trees but more
13 bare and exposed soils?

14 A. Well, the bare exposed soil may not
15 be a consequence of the harvesting. I am sorry, but
16 there may be scattered trees or there may not be
17 scattered trees, but the bare exposed soil is another
18 matter.

19 Q. Is it not the case that normally with
20 clearcutting large expanses of land are left - large or
21 small - but let's just talk about the clearcutting
22 process, in which the soil is relatively exposed and,
23 for example, does not have the kind of shading that a
24 soil has after a fire when there are the charred
25 remains of the trees remaining?

1 A. Indeed following clearcutting there
2 may be a very full canopy of lesser vegetation, woody
3 shrubs that occupies the area.

4 Q. Not immediately afterwards surely?

5 A. Oh yes. It may, in many instances,
6 it is there already, particularly on these mixed wood
7 stands.

8 Q. Okay. Is it not the case that in
9 some clearcut areas, particularly large ones, the
10 feather mosses in the land dry out and die from high
11 temperatures releasing the nutrients which can be
12 utilized or can also leach within a few years?

13 A. Yes, and where feather mosses occur
14 of different kinds, depending on the nature of the
15 exposure they will often die and, as a result, they are
16 then decomposed and release nutrients.

17 Q. So that the presence of the unburnt
18 forest remains and the degree of the burn of the humus
19 soil that is living and is now all destroyed, can be
20 important differences between the effects of fire and
21 of clearcutting?

22 A. There can be differences. How
23 important they are will depend on the particular
24 situation and, in this case, what are the objectives in
25 terms of management.

1 Q. Okay. Now, do you agree that forest
2 fires, despite our efforts to control them, are very
3 often or perhaps usually put out by natural rains?

4 A. I can't speak to the degree to which
5 fires are put out by natural rains as compared to man's
6 efforts to put them out, I am not familiar with that --
7 statistics on that. It does happen certainly on large
8 fires.

9 Q. And would you agree that the rains
10 that follow a natural fire have been enriched by the
11 nutrients of the release through the fire in the smoke
12 and tend to be nutrient rich when they fall to the
13 earth?

14 A. Yes, I have already indicated that
15 they may fall at some very considerable distance from
16 the actual fire, perhaps even on clearcut areas.

17 Q. Right. There is no equivalent to
18 that with clearcutting?

19 A. No, that's correct. There is,
20 however, with -- to a much smaller degree with
21 prescribed burning.

22 Q. Right. Now, would you agree that in
23 these conditions of fire and then the resulting rain,
24 that post-fire we often see very large numbers of
25 conifer seedlings germinating quite quickly?

1 A. I wouldn't say that was a general
2 observation, it would depend on the nature of the stand
3 that was burnt and the time of the fire and other
4 factors. In a black spruce and jack pine stand, then
5 seedlings which normally appear within the first,
6 certainly two, three years after the fire. One would
7 expect that.

8 Q. You wouldn't expect them sooner than
9 that?

10 A. Well, the release of the seed is
11 often somewhat gradual and the germination doesn't all
12 occur in the first year. It can -- we know that,
13 particularly with jack pine, there is a progression in
14 the germination of seed, they may follow all one year,
15 but they germinate over a two to three-year period at
16 least.

17 Q. So you would disagree with the
18 position that germination tends to -- of jack pine and
19 black spruce after forest fire tends to be more rapid
20 than taking one or two or three years?

21 A. No, it is over that period of the
22 first one to three or four years that one sees the
23 seedlings. I am not quite clear what your question is.
24 Do they all appear the first year, or do they come up
25 subsequently. And I am just...

1 Q. Well, we have already established
2 that these two species are particularly adapted to fire
3 with regard to the serotinous cones. And I am putting
4 to you the suggestion that following a fire and the
5 effect of the fire on those cones it is common to see
6 rapid germination of conifer seedlings.

7 A. But the rapid germination, even
8 within the first year is -- really those seedlings
9 occupy a very small area of the exposed surface and it
10 is really over the two to three year or sometimes even
11 four years, but over those first three years that one
12 gets the larger numbers of regeneration.

13 Q. Now, by that do you mean larger
14 seedlings or more germination?

15 A. Well, both. The seedlings that are
16 there the first year grow larger and there is
17 subsequent germination in the second and third years
18 and that fills in the area.

19 Q. Okay. Now, would you agree then with
20 respect to the concept of forest resiliency that an
21 important factor is the temperature/moisture
22 relationship which is better regulated after fire given
23 the standing timber remains, then after a clearcut?

24 A. I won't agree that it is better
25 regulated, in fact the extremes can be as high if not

1 higher.

2 Q. How is it regulated on a clearcut, in
3 your opinion?

4 A. Well, in neither instance are they
5 regulated. What I believe you are referring to...

6 Q. Shall we say moderated then.

7 A. Well, on a clearcut or even on a
8 fire, if it were very small, it will be moderated by
9 surrounding stands, it will be moderated to the degree
10 that it occurs on the one aspect rather than another,
11 it will be moderated by very many factors.

12 A fire or a clearcut for that matter on a
13 north slope is going to be moderated in terms of
14 moisture and temperature extremes in our area to a much
15 greater degree than one on a south slope and this is
16 very evident from inspections of both fires and
17 clearcuts.

18 Q. And are you saying then that the
19 charred remains play no role in moderating temperature
20 on the floor of a burnt forest?

21 A. The charred remains?

22 Q. Of the standing timber that is
23 charred but remains.

24 A. Well, as I indicated, on a north
25 aspect a standing tree -- you are referring to the dead

1 trees that are there?

2 Q. Yes.

3 A. May or may not play a role and many
4 of them, of course, over a period of a few years blow
5 over, that is the normal sequence. But they may or may
6 not play a factor in moderating surface soil
7 temperatures, which I believe is what you are asking.

8 Q. Now, would you agree that mechanized
9 logging may and sometimes does result in soil
10 compaction and rutting in clearcuts?

11 A. It can result in rutting, the degree
12 to which it results in compaction would be very --
13 highly variable and, as I indicated earlier, in some
14 soils...

15 Q. I agree it is variable.

16 A. Yes, okay.

17 Q. But it can occur; right?

18 A. I would say rutting is obviously much
19 more a visible thing than compaction. It can occur,
20 yes.

21 Q. And there is no equivalent to that
22 with fire?

23 A. No, there is no mechanized intrusion
24 on the site.

25 Q. All right.

1 THE CHAIRMAN: Ms. Swenarchuk, would you
2 find a convenient place for a morning break, please?

3 MS. SWENARCHUK: Five minutes, more.

4 THE CHAIRMAN: Okay.

5 MS. SWENARCHUK: We will finish this
6 section.

7 THE CHAIRMAN: Very well.

8 MS. SWENARCHUK: Q. And would you agree
9 too that fire can have a kind of, shall we say,
10 sanitizing effect of burning off diseased trees, fungal
11 pathogens and insects?

12 A. Yes, it can destroy insect and
13 certainly it can destroy fungi.

14 Q. Whereas with harvest often these
15 trees are left on the site to rot?

16 A. Yes, although the fungi that
17 decomposes can still exist after a fire in the existing
18 forest floor. It is not a sanitizing in the sense of
19 removing all the...

20 Q. Right, is not totally -- it doesn't
21 remove all pathogens, but it would remove some
22 presumably?

23 A. Yes. And if I might, fires are
24 typical in that burning through a forest is a variety
25 of conditions so there is usually residual stems and

1 clumps of stands that are alive and they are not
2 burned.

3 Q. Right.

4 A. There is usually a mosaic pattern.

5 MS. SWENARCHUK: We could stop there, Mr.
6 Chairman.

7 THE CHAIRMAN: Very well. Let's take a
8 break for 20 minutes.

9 ---Recess taken at 10:35 a.m.

10 ---Upon resuming at 11:05 a.m.

11 THE CHAIRMAN: Thank you. Be seated,
12 please.

13 MS. SWENARCHUK: Q. Now, just one last
14 question on the degree to which the surface may be
15 shaded after fire. And you referred to the fact that
16 after clearcutting with mixed wood stands there may be
17 shade and also with fire.

18 Now, would you agree that where
19 conifers -- a pure conifer stand burns -- or rather,
20 sorry, where a pure conifer stand is harvested, there
21 is not likely to be available shade in the area?

22 A. No, not unless there were adjacent
23 stands to the degree that there is some limited limited
24 edge shading, yes.

25 Q. Now, one last question regarding

1 fire. I guess we can look at Panel 10, Volume II, page
2 854 and it is just one sentence that forms part of that
3 witness statement and starts at the bottom of page 853
4 and the sentence is:

5 "In general, wild fire has only
6 minor effects on nutrient exports."

7 And the source quoted is Freedman. And I assume you
8 would agree with that statement?

9 A. I suppose, in general, that is an
10 accurate statement.

11 Q. So in these various elements that we
12 have discussed, Mr. Armson, I think we see ways in
13 which jack pine and black spruce have evolved in
14 relation to fire disturbances, but would you agree with
15 me that there is no thousand or several thousand year
16 history of clearcutting and they have not evolved in
17 the same way in relation to clearcutting?

18 A. That's correct.

19 THE CHAIRMAN: Ms. Swenarchuk, just so
20 you can properly organize yourself, it is the Board's
21 intention to sit to about twelve and then break for
22 three quarters of an hour for lunch and then come back
23 and then adjourn at two.

24 MS. SWENARCHUK: Mm-hmm.

25 THE CHAIRMAN: We think it will be a long

1 session to go right through until two o'clock and it
2 may give people an opportunity to run downstairs and
3 get a sandwich or a snack or something and then come
4 back.

5 MS. SWENARCHUK: Based on yesterday, I
6 wouldn't recommend that.

7 THE CHAIRMAN: Well, McDonald's is just
8 down the street.

9 MS. SWENARCHUK: Q. Could we turn now to
10 the clearcutting policy materials, Mr. Armson.

11 A. Yes.

12 Q. Now, if we look at the 1975 version
13 of the policy which is appended to this memorandum, the
14 December 23rd memorandum from Flowers to Robinson.

15 A. Yes, I have that.

16 Q. The third paragraph of that policy
17 indicates that --

18 THE CHAIRMAN: I can use this one,
19 thanks.

20 MS. SWENARCHUK: Q. The third paragraph
21 indicates and at that time:

22 "Evidence is mounting that excessively
23 large clearcuts do not regenerate as well
24 as more protected smaller cuts."

25 Do you have the reference?

1 A. Well, that is the statement.

2 Q. Yes, I just want to review the
3 statement for a second.

4 A. Yes.

5 Q. And then I will ask you a question on
6 it.

7 A. Yes, I have it.

8 Q. "Large clearcut areas are also more
9 subject to site deterioration Due to
10 exposure. The large clearcuts
11 drastically alter wildlife habitat and
12 create aesthetically objectionable
13 landscapes."

14 And then on Appendix 2, the second paragraph from the
15 bottom:

16 "Numerous Ontario Ministry of Natural
17 Resources regeneration surveys show the
18 lack of suitable regeneration following
19 clearcutting and that patterns of
20 regeneration appear to be influenced by
21 the size of the cut."

22 And then the next paragraph refers to a study with
23 regard to micro-climatic extremes and the vegetation
24 and soil surface layers on the exposed forest sites.

25 Now, is it your position, Mr. Armson,

1 that the size of clearcuts is irrelevant to the
2 successive regeneration activities?

3 A. It is not irrelevant, but the
4 examples that I have seen where there were concerns
5 expressed in terms regeneration, the lack of
6 regeneration could be explained by other than purely
7 the size of the clearcut.

8 Q. Okay. Before we deal with that in
9 detail, is it your view that in those areas, the size
10 of the cut played no role in the relative regeneration
11 success or lack of success?

12 A. I won't say it played no role, but
13 where, for example, there was little regeneration and
14 it was a large clearcut and it could be attributed, as
15 best we could, to the absence of a seed source, it
16 would seem to me that the problem was the absence of a
17 seed source rather than the size of the clearcut, per
18 se.

19 Q. Now, is it your position that with
20 regard to artificial regeneration strategies the size
21 of clearcut is irrelevant to their success or failure?

22 A. It will depend on the situation and
23 the species.

24 Q. And are there situations and species
25 for which, in your view, the size of a clearcut will

1 have an impact on regeneration success or failure?

2 A. More than just the size, the
3 configuration I would suggest and dimensions. For
4 example, and I believe I cited this earlier,
5 clearcutting in relation to the regeneration of yellow
6 birch, it is quite important to maintain a seed source
7 within a relative -- certain distances. What the size
8 of the clearcut may be is another matter, it may be a
9 long narrow one or it may be a short narrow one. The
10 sizes would be quite different, the dimensions with
11 respect to seed source would be very similar.

12 Q. In your view, is the size of the cut
13 a factor in that regeneration or not?

14 A. By size, if you...

15 Q. In addition to configuration, is size
16 a factor?

17 A. The absolute area, in my view, is a
18 very minor factor.

19 Q. Now, are you limiting that to the
20 yellow birch example you just mentioned?

21 A. No, I would relate that to any number
22 of examples in terms of both exposure, the
23 configuration and dimensions, particularly dimensions
24 relating to the interior, if you will, of the opening
25 and its distance to the edge become quite important.

1 What the absolute area is can be very highly variable.

2 Q. Certainly it can be highly variable.

3 Does it not follow from what you are saying that a very
4 large area with increased distances to edge could be
5 more disadvantageous for regeneration?

6 A. The distances to edge, the
7 conditions, the species, and the management objectives
8 as well as what other values are being considered,
9 become then key elements, not the absolute area itself.

10 Q. All right. But it is a factor, is
11 that -- have you said that?

12 A. It is a product of those others; the
13 size, the dimension in terms of area is a product
14 really of the configuration and the distribution of
15 that opening, however it is configured on the
16 landscape.

17 Q. Are there circumstances in which you
18 would attempt to create the configuration of a cut, a
19 cut or contiguous cuts so as to limit the absolute size
20 of the clearcut?

21 A. As I indicated, I think you would not
22 start with the absolute size. You are assuming there
23 is a limit there, and I cannot accept that.

24 If for a particular value you wished to
25 have - and this is set in front - a size of opening as

1 expressed by a radius or something like that of 50
2 hectares or five hectares, for that matter, then I can
3 see that as an element that then goes into the planning
4 of the cut-over in the particular situation. But
5 starting with the size as an area, seems to me the
6 wrong way to go about it.

7 Q. In any circumstance?

8 A. Yes.

9 Q. Okay. Now, if we look back at the
10 1971 document which was the first one in the bundle, at
11 page 5 of it.

12 A. Is that Appendix 1, because -- I am
13 sorry?

14 Q. It is a document that looks like this
15 (indicating). It is the first --

16 A. I don't have the front cover, but it
17 is the document that follows on the memorandum to
18 Robinson of December the 23rd.

19 Q. No, it is a document that begins:

20 "The purpose of this report is to suggest
21 a new approach to the control of
22 logging."

23 MR. FREIDIN: It is the December, '71 one
24 that was referred to and in the first two paragraphs
25 talking about the work that has been done. 1971.

1 MR. ARMSON: 1971.

2 MR. FREIDIN: And it should be at the
3 front of the package.

4 MR. ARMSON: I am sorry. Yes, I have
5 that here.

6 MS. SWENARCHUK: Q. Do you have that?

7 A. Yes.

8 Q. At page 5, you have it open?

9 A. Yes, I have page 5.

10 Q. The last paragraph indicates that:

11 "Present logging methods have developed
12 to extract wood at the lowest cost."

13 This is essentially clearcutting that they are
14 discussing; is it not?

15 A. Well, it just says logging method,
16 but much of it would be clearcut, yes.

17 Q. Yes. But changes in logging methods
18 will affect costs. And then on the next page we see
19 that:

20 "Present practice is to compensate
21 licensees for extra costs of strip
22 cutting in the boreal forest and not to
23 compensate them for strip cutting in
24 white pine or tolerant hardwood."

25 Now, I understand that companies are

1 still compensated in some circumstances for using
2 methods other than clearcutting; is that not correct?

3 A. Are you referring to all the
4 companies generally or are you referring to forest
5 management agreement holders? I am not clear. There
6 could be some difference.

7 Q. Well, perhaps you could address both.

8 A. Well, there may well be compensation.
9 I can't speak to that -- to licensees who are carrying
10 out certain forms of cutting on Crown management units.

11 To my knowledge, on the forest management
12 agreement areas, the compensation is paid in relation
13 to negotiated and agreed activities that deal with
14 regeneration and the initial tending of that
15 regeneration, they do not relate to the harvesting as
16 such; that is, the cutting.

17 Q. The document refers to compensation
18 for strip cutting--

19 A. But this is --

20 Q. --in the 70s?

21 A. In '71, yes.

22 Q. Now, at this point in history if an
23 FMA holder is doing strip cutting it presumably could
24 be considered to be part of the holder's regeneration
25 responsibilities. Is this what you are saying, and

1 that would be the method of --

2 A. No, I am saying just in reverse. To
3 my knowledge that is not the case.

4 Q. All right.

5 A. The 1971 document refers to a set of
6 conditions prior to the initiation of forest management
7 agreements.

8 Q. Right. I recognize that, I am
9 saying: Looking at the situation now and recognizing
10 that FMA holders are compensated for certain
11 silvicultural practices--

12 A. Yes.

13 Q. --do those silvicultural practices
14 include, for example, strip cutting?

15 A. To my knowledge, no, and I believe --
16 and that was never the intent within the negotiation
17 agreements. I would be very surprised if you have an
18 example of that. To my knowledge it doesn't occur.

19 Q. I am surprised at your response. I
20 haven't brought the examples, I think there will be
21 examples during the hearing, but I am interested in
22 your response that that was not the intent of the FMAs?

23 A. It was very definitely not the
24 intent.

25 THE CHAIRMAN: And are you indicating

1 that it is your understanding, Ms. Swenarchuk, that
2 payments were made to companies if they used methods
3 other than strip cutting?

4 MS. SWENARCHUK: Other than clearcutting.

5 THE CHAIRMAN: Other than clearcutting?

6 MS. SWENARCHUK: Yes.

7 THE CHAIRMAN: Okay.

8 MS. SWENARCHUK: Were made and are made,
9 was my understanding.

10 Q. Now, if we could look at your paper
11 from December, Mr. Armson.

12 A. Yes.

13 Q. At page 3 you have indicated that, in
14 your view, the major issues relating to clearcutting
15 are more perceptions than reality - we will probably
16 argue with you about that - but if you could take a
17 look at bullets 3, 4, 5 and 6; is it your position that
18 large area clearcuts never have those effects?

19 A. Never is a pretty categorical
20 statement and the conditions under which they are
21 carried out, but what I am saying here is that if it is
22 viewed as generally having the effects listed in 3, 4
23 and 5 --

24 Q. 3, 4, 5 and 6.

25 A. Or 4, 5 and 6, sorry, that I would

1 stand by those statements.

2 Q. Would you agree that there are
3 circumstances in which large area clearcutting does
4 have these impacts?

5 A. In certain circumstances it could,
6 very special ones.

7 Q. I would like to go back to the
8 document that you referred to yesterday, Harvest Cut
9 versus Regeneration Treatment on Crown land.

10 A. Yes.

11 Q. And I will just ask you one quick
12 question about it. Does regeneration treatment here
13 include artificial regeneration -- natural
14 regeneration?

15 A. Yes, where it is planned in terms of,
16 there may be site preparation to enhance natural
17 regeneration, there may be cutting methods used for
18 that.

19 Q. So then the gap that we see between
20 area harvested and area for which a treatment exists is
21 not a gap that could be filled by silvicultural -- or
22 that is filled by silvicultural methods tending to
23 foster natural regeneration, those methods would be
24 included in the environment?

25 A. In our system, that's correct.

1 Q. So we do have a gap; do we not?

2 A. There is a difference, yes, in the
3 area.

4 Q. Yes. Could we look at page 5 of your
5 statement, please. In the third paragraph of the stage
6 you have said that:

7 "The solution to much of the concern was
8 to ensure that clearcutting took place as
9 part of the application of a set of
10 silvicultural prescriptions applied to
11 specific forest conditions..."

12 And then you refer to the development.

13 MR. FREIDIN: What paragraph?

14 MS. SWENARCHUK: It is the third
15 paragraph.

16 Q. "Coincidentally, during the late 70s,
17 the development of more and better timber
18 management plans and requirements since
19 1980 of silvicultural prescriptions for
20 all FMAs, and since 1986 for all plans,
21 has meant that a simplistic policy
22 on clearcutting is irrelevant."

23 Does it not remain, however, Mr. Armson, that a
24 considerable amount of the forest that is cut is not
25 yet subject to any type of regeneration treatment?

1 A. That's correct.

2 Q. And the Ministry's statistics, I
3 believe in Panel 10, indicate that 89 per cent of
4 harvesting in Ontario is by the clearcut method. So we
5 are entitled to assume; are we not, that a large
6 proportion of that gap is clearcut areas which are not
7 subject to regeneration treatment?

8 A. Not subject to regeneration
9 treatment. They may be subject to regeneration, but
10 not treatment.

11 Q. Right. Now, in the 70s, as we heard
12 earlier, writers of these documents referred to
13 clearcutting as being used for extraction -- purely for
14 economic extraction.

15 Now, aren't we entitled to conclude that
16 the large gap that exists between regeneration
17 treatments and harvest totals indicates that there is
18 still a considerable portion of harvest that is done
19 purely for extraction without planning for regeneration
20 treatments?

21 A. No, you cannot make that assumption.

22 Q. How has it changed in those areas?

23 A. Because the timber management
24 planning process requires that there be silvicultural
25 prescriptions for the areas on which activities are to

1 be carried out.

2 The silvicultural prescription may be for
3 it to be harvested, let's say it is a clearcut some
4 time, and then be allowed to regenerate naturally
5 without any further treatment.

6 Q. Okay. But I asked you that in the
7 beginning, I asked whether the regeneration line here
8 includes regeneration by natural means, and I believe
9 you said it did, and that's why I arrived at this gap
10 between harvest and areas that are being regenerated
11 whether by natural or artificial means?

12 A. Well, I am sorry, if there was -- the
13 area, the gap will regenerate to one or more species
14 without treatment.

15 Q. So how is that to differ from
16 regeneration treatment oriented towards natural
17 regeneration--

18 A. Well, it differs --

19 Q. --Which you said was included in the
20 treatment line?

21 A. It differs -- let me give you an
22 example, and perhaps this will clarify it.

23 In this case I will use aspen poplar. If
24 a stand of aspen poplar is cut, and there is
25 considerable areas of aspen poplar that are cut, the

1 silvicultural prescription may be to let that
2 revegetate, regenerate to aspen poplar which will
3 normally happen as a result of propagation from the
4 roots. So that -- the prescription would be to cut,
5 clearcut it in this case, and have it regenerate.

6 That area would be included in that
7 so-called gap. There is no silvicultural treatment, it
8 is purely a harvesting activity.

9 Q. So treatments here include site
10 preparation, planting, artificial seeding; is that
11 right?

12 A. That's right. The lower curve which
13 you see there, regeneration treatments are those
14 activities carried out in which there is an investment,
15 if you will, that deals with site preparation, seeding
16 or a particular layout of a cut, very specifically
17 shelterwood cutting and so on, to bring about
18 regeneration.

19 Q. Those are all encompassed in that
20 gap?

21 A. That's right -- no, they are
22 encompassed in the regeneration treatment.

23 Q. I am sorry, right. Okay. Can we
24 move on to the third paragraph on page 5 of your
25 December paper, the last sentence of which reads:

1 "The crux of much of the concern focuses
2 on the temporal and spacial extents of
3 the clearcut area as perceived in one
4 instant in time. "

5 Now, what's your basis for concluding that that's the
6 crux of the concern?

7 A. Much of it relates to discussions
8 with people, much of it relates to reading of
9 literature generally, certainly in the general media
10 concerning perceptions, and I use that word again of
11 the clearcut area.

12 An area that is viewed at any time
13 immediately following clearcutting will appear usually
14 to have a lot of residual material, stumps, slash and
15 so on and to many people that -- they have a concern
16 for that.

17 Q. But isn't it possible that informed
18 individuals may have a concern for the effect of large
19 area clearcutting on long-term forest productivity and
20 simply come to a different conclusion than you have
21 come?

22 A. Oh, that's quite possible.

23 Q. And those individuals are not
24 encompassed in your description here of where the
25 concern arises?

1 A. Well, I am saying the temporal and
2 spacial extents, and I believe that to many people
3 those are matters of concern even to those who you were
4 suggesting would not view it in such a simplistic
5 manner.

6 Q. Well, I can't agree, Mr. Armson.
7 What I have said to you is: Isn't it possible that
8 there are individuals who are concerned not merely with
9 temporal and spacial extents of the clearcut areas but
10 with effects on productivity? That's a different
11 issue.

12 A. Well, that's correct.

13 Q. All right.

14 A. I don't deny that.

15 Q. Now, on the first page of your
16 document you indicated that:

17 "The key issues and facts..."

18 This is on the third paragraph of page 1:

19 "...of this continuous debate have been
20 set forth comprehensively by the report
21 of the President's Advisory Panel on
22 Timber in the Environment in 1973."

23 And, as you are aware, part of that report, or the
24 report actually is reproduced for us in Panel 10,
25 Volume I--

1 A. That's correct.

2 Q. --beginning at page 294. And if we
3 could turn to the section that deals with clearcutting
4 at page 324 to 326. And if we look at page 326, the
5 third paragraph, presumably you agree with the
6 conclusions reached of this panel that:

7 "Clearcutting should not be the subject
8 of government regulations, legislation or
9 executive order."

10 A. I agree.

11 Q. Now, Mr. Armson, I have reviewed this
12 and I see in it some references to desirability of
13 small area clearcutting and the non-desirability of
14 large-scale clearcutting. And before I go to that, I
15 just want to put to you that I don't see in this
16 document any endorsement of large-area clearcutting?

17 A. No, there is not an endorsement,
18 neither is there -- as the statement says it should
19 neither be universally practised nor universally banned
20 and that the decision should be left to the forest
21 managers.

22 Q. Well, could we look at page 326, the
23 left-hand column, five lines down from the top. They
24 had just been talking about Douglas -- in the previous
25 page, they had been talking about Douglas fir forests

1 and the suitability of clearcutting there under many
2 circumstances. And then they begin on page 326 saying:

3 "At the other extreme, large-scale
4 clearcutting is generally undesirable.
5 The most desirable management, therefore,
6 will often be small-area clearcuttings in
7 which the margin of the uncut forest is
8 left so as to minimize wind damage to the
9 standing trees and the clearcut area is
10 of the optimal size for natural
11 regeneration from seed from the marginal
12 trees for deer browse production, and
13 for minimizing the aesthetic impact of
14 the cutting operation."

15 Do you agree then that in that quote they are endorsing
16 the desirability of small-area clearcuts?

17 A. He is talking about the Douglas fir
18 region of the Pacific northwest and he is relating in
19 that paragraph -- it is all related to that, and from
20 my knowledge of that area I have no problem with his
21 statement.

22 Q. Okay. If we look at page 325, the
23 second column -- the second column and first full
24 paragraph at the top with regard to aesthetics:

25 "Clearcutting does have a generally

1 adverse aesthetic effect and this may be
2 serious enough in specific instances in
3 areas to merit the minimization or
4 elimination of clearcutting. The
5 undesirable aesthetic effect of
6 clearcutting, however, can be minimized
7 and restricted to a matter of a very few
8 years if the area of the clearcut is
9 small and if reforestation is immediate."

10 So that would be, in their view, a viable means of
11 dealing with some of the objections that individuals
12 have to aesthetics?

13 A. Yes. And as I explained to the Board
14 and used the flip chart to illustrate, smallness of
15 itself isn't necessarily the only way in which you can
16 achieve something that can be aesthetically acceptable.

17 Q. Further down that column they have
18 referred again to:

19 "Another special case consists of
20 extremely steep and fragile sites. In
21 such circumstances, either no cutting at
22 all should be permitted or else cutting
23 should be deferred until logging
24 techniques are developed which will
25 provide a high degree of safety and site

1 protection."

2 So, again, they are qualifying the use of clearcutting?

3 A. Oh, yes.

4 Q. You agree with that?

5 A. I have no problem with qualifications
6 of where clearcutting is used, I made that clear.

7 Q. Now, you are aware; are you, Mr.
8 Armson, that ultimately the recommendations of this
9 panel were not followed in the United States and
10 clearcutting size limitations have been legislated?

11 A. I am aware that under the National
12 Forest Management Act and subsequent regulations that
13 has happened, yes, on national forests.

14 Q. Exactly. I will just distribute that
15 regulation.

16 THE CHAIRMAN: This will be Exhibit 427.
17 Where is this an excerpt from?

18 MS. SWENARCHUK: This is from the United
19 States Code of Federal Regulations, Mr. Chairman, the
20 citation is at the top left-hand page.

21 THE CHAIRMAN: Thank you.

22 ---EXHIBIT NO. 427: Two-page excerpt from the United
23 States Code of Federal
Regulations.

24 MS. SWENARCHUK: Q. And if we look at
25 the second page of the two-page excerpt, the left-hand

1 column, the third paragraph down - I will just note for
2 the Board the variations in sizes that are recorded
3 there:

4 "Individual cut blocks, patches or
5 strips shall conform to the maximum size
6 limits for areas to be cut in one harvest
7 operation established by the regional
8 guide according to geographic areas and
9 forest types. This limit may be less
10 than but will not exceed 60 acres for the
11 Douglas-fir forest type..." "...80 acres
12 for the southern yellow pine..." "...100
13 acres for hemlock-sitka spruce of coastal
14 Alaska; and 40 acres for all other forest
15 types except as provided in the
16 exceptions ..."

17 Which I understand have to do largely with salvage
18 operations, and particular kind of timber sale
19 operations. Would you agree with that?

20 A. Yes, and timber sale operations are,
21 of course, a major component.

22 Q. Now, I have been informed, and could
23 you indicate whether you agree with me on this, that
24 with regard to contiguous cuts that the regrowth of the
25 clearcut must reach a certain height before a

1 contiguous cut is permitted?

2 A. I believe that's the case. I am
3 not --

4 Q. We will see an example of that in a
5 moment. And that in fact there are very few exceptions
6 provided for in the regional guides to these maxima
7 that are stated in the regulation?

8 A. In speaking with senior staff of the
9 U.S. Forest Service, I asked them very specifically the
10 exceptions and they said they were very few and far
11 between.

12 Q. And that, in general, the clearcut
13 sizes, in fact, are smaller than the maxima provided?

14 A. I can't speak to that, I don't know
15 what the actual dimensions are.

16 Q. Fine.

17 MS. SWENARCHUK: Now, we have as well an
18 excerpt from an American Management Plan, Mr. Chairman,
19 which I will file to indicate how this size restriction
20 operates in this particular plan.

21 THE CHAIRMAN: Exhibit 428.

22 ---EXHIBIT NO. 428: Excerpt from an American
23 Management Plan entitled: Land
24 and Resource Management Plan,
Huron-Manistee National Forests.

25 MS. SWENARCHUK: And this is exhibit

1 No...?

2 THE CHAIRMAN: 428.

3 MS. SWENARCHUK: Q. Now, Mr. Armson,
4 this is a management plan for the Manistee National
5 Forest which I understand is in Michigan; is it not?

6 MR. FREIDIN: Part of the plan?

7 MS. SWENARCHUK: It is part of the plan.

8 MR. ARMSON: Well, according to the map
9 on the frontest piece, it would appear to be in
10 Michigan, yes.

11 MS. SWENARCHUK: Q. You will take my
12 word for it; will you?

13 A. I will accept that, yes.

14 Q. And if we look at the last page of
15 the excerpt II, Section A it indicates the 40-acre
16 maximum in (4) and in (1), (2) and (3) indicates
17 when -- essentially when a contiguous cut can become
18 established. Now, presumably you don't agree with the
19 American decision to institute this type of regulation,
20 Mr. Armson?

21 A. That is correct.

22 Q. And, to your knowledge, has it
23 resulted in any deleterious impacts on American
24 forests?

25 A. I can't speak to that at all.

1 Q. Okay.

2 MS. SWENARCHUK: Those are all my
3 questions, Mr. Chairman.

4 MR. FREIDIN: I would like to see the
5 entire plan, Ms. Swenarchuk. Do you have it or could
6 you make it available to me, please?

7 MS. SWENARCHUK: I will. It is an
8 enormous document, so...

9 MR. FREIDIN: I, nonetheless, would like
10 the plan produced.

11 MS. SWENARCHUK: Fine.

12 MR. FREIDIN: Or if not filed with the
13 Board necessarily, but I would like an opportunity to
14 see the plan. I assume that you have it?

15 MS. SWENARCHUK: I don't have it with me,
16 but yes, I have it. Can I just -- these plans are
17 enormous and I think my source only has one copy, Mr.
18 Freidin. So can we have it back?

19 MR. FREIDIN: Have it back? Sure.

20 THE CHAIRMAN: So you are completed your
21 entire cross-examination; is that what you are saying?

22 MS. SWENARCHUK: That's right, yes.

23 THE CHAIRMAN: Very well.

24 Ms. Seaborn, are you ready to proceed
25 after lunch?

1 MS. SEABORN: Yes, Mr. Chairman.

2 THE CHAIRMAN: Okay. Why don't we break
3 now until 12:30 and then we will proceed with the
4 Ministry of the Environment's cross-examination until
5 two o'clock and then we will break for the week.

6 Thank you.

7 ---Luncheon recess taken at 11:45 a.m.

8 ---Upon resuming at 12:35 p.m.

9 THE CHAIRMAN: Thank you. Be seated.

10 Ms. Seaborn?

11 MS. SEABORN: Mr. Chairman, I would just
12 like to start by advising the Board of the additional
13 documents that I will be referring to, other than the
14 Panel 9 witness statement and the Panel 10 material.
15 You will not need the additional documents for the
16 cross-examination today, given the limited time that is
17 left.

18 The Exhibit 382, which is the
19 Silvicultural Guide for Black Spruce; Exhibits 422 and
20 423 which are the Gordon reports and the Weetman and
21 Webber reports; Exhibit 56 which is the Forest
22 Resources Inventory of Ontario, 1986; the Panel 2
23 witness statement, and I am not sure what the exhibit
24 number is for that.

25 The other thing I would like to do at

1 this point is file a number of interrogatories that we
2 posed with respect to this panel and the matters in
3 Panel 10 that have been shifted to Panel 9 and if that
4 bundle could be given an exhibit number. (handed)

5 THE CHAIRMAN: Thank you. Exhibit 429.

6 ---EXHIBIT NO. 429: Bundle of interrogatories and
7 answers posed by MOE.

8 MS. SEABORN: One other matter, before I
9 begin my questions, Mr. Chairman. There are a number
10 of questions that I have with respect to Exhibit 418K
11 and that was the photograph of the white pine that was
12 taken in the Algonquin region, and what I would like to
13 do is just list for Mr. Armson, and Mr. Freidin's
14 benefit, the information I would like with respect to
15 that site because it may be that between now and
16 Tuesday Mr. Armson can collect the additional material
17 for me and I can deal with it at that time.

18 And to the extent at the present time
19 that he knows the information now, I am not going to be
20 questioning him about that photograph today. So in any
21 event, I will deal with it on Tuesday.

22 The first thing I would like to know with
23 respect to that site is the exact location of it within
24 the Algonquin region and I would like to have a
25 topographical map that marks off the exact location of

1 that stand for the area.

2 The second thing I would like to have is
3 a copy of the FRI map that would identify that
4 particular stand. We looked at FRI maps in the earlier
5 panels...

6 MR. FREIDIN: When do you want that?
7 when? For the coming -- like there has been more than
8 one FRI map. I don't know whether there is...

9 MS. SEABORN: I guess that leads me to
10 the third question. I don't know when that tree was
11 cut, so I would like to know when it was cut and so I
12 would like the FRI immediately before the stand was
13 cut.

14 MR. ARMSON: Mr. Chairman, if I might.
15 The cutting took place some 20 odd years ago and I am
16 not sure whether there was actually an FRI for the
17 area. There may well be, but we can look into that.

18 MS. SEABORN: That is fine, thank you.
19 The other thing I would like is any documents that
20 would tell us the silvicultural prescription that has
21 been applied since the cutting of that site in terms of
22 harvest -- harvest we have had, but renewal and
23 maintenance of that site.

24 And, as well, Mr. Armson, any additional
25 information that you can provide us with with respect

1 to the statement you made that a group or individual -
2 I am not sure what it was - that had identified that
3 site at some point in time as being sensitive, and then
4 I believe your evidence was that after that
5 determination was made someone went in and had a look
6 at the site and came to a different conclusion.

7 I would like to know the basis upon which
8 the first group, and whoever they were, and the name of
9 that group identified it as a sensitive site.

10 MR. ARMSON: I was party to the
11 identification in the first place, so we don't have far
12 to look.

13 MS. SEABORN: Okay, thank you.

14 CROSS-EXAMINATION BY MS. SEABORN:

15 Q. Mr. Armson, we have dealt a lot in
16 the past week or so with the similarities that exist
17 between natural disturbance and human disturbance;
18 correct?

19 A. Yes.

20 Q. And using the natural disturbance of
21 fire as the benchmark, I want to focus for a moment on
22 some of the differences between depletion of the forest
23 by fire and harvesting of the forest by man.

24 A. Mm-hmm.

25 Q. Now, could you tell me how the

1 effects of harvest would differ from those of the
2 natural disturbance of fire?

3 A. Well, a number of those, as I say, we
4 have discussed. There would be differences in terms of
5 the forest floor in that the fire would consume part of
6 it and leave some residual ash. In so doing it would
7 destroy essentially all the lesser vegetation in
8 certain situations, and I believe Ms. Swenarchuk
9 referred to these.

10 The fire will consume all the vegetation
11 but leave standing dead stems, whereas in a clearcut
12 there may or may not be any standing or residual trees.
13 It may be quite literally clearcut in terms of the tree
14 or it may -- there may be residual individuals or
15 groups of individuals of a species that are not
16 utilized.

17 So the main differences then would be:
18 In the clearcut area there is an existing lower
19 vegetation which is there certainly immediately
20 following the cutting and the forest floor, although it
21 will be disturbed, will not have received any burning
22 treatment, it will be there in essence. It will change
23 over time, but it will be there.

24 So those would be -- those I think would
25 be some of the key differences in terms of the residual

1 vegetation and in terms of the surface of the soil.

2 Q. There is some other differences that
3 I would like to identify and see if you would agree
4 with me - and I apologize if I may be appear to be too
5 trite on this - but wouldn't you agree with me that
6 another difference between harvest by man and a natural
7 wild fire is that after a wild fire you don't have a
8 road system; do you?

9 A. Yes, quite -- you have to have access
10 to extract timber, correct.

11 THE CHAIRMAN: Excuse me, could you not
12 sometimes have roads put in to fight a fire?

13 MR. ARMSON: Well, you would, but I think
14 the point here is it would be before rather than after
15 the event; in the sense, during the event, but yes, I
16 am sorry, I assumed access and certainly in fighting a
17 fire there may be roads.

18 MS. SEABORN: Q. And you wouldn't have
19 culverts after a wild fire?

20 A. Not after a normal natural fire, I
21 don't think so.

22 Q. And soil compaction is another effect
23 of man's harvest that you don't have with a natural
24 wild fire?

25 A. Well, whether the compaction occurs

1 or not is dependent on many other factors, so they
2 might be quite equivalent.

3 Q. Well, I guess my point is that the
4 cause of soil compaction tends to be man's harvest not
5 a wild fire?

6 A. Except for rain on certain kinds of
7 soils that are exposed, but that is minimal, and I
8 would agree.

9 Q. And the same could be said for soil
10 rutting?

11 A. I doubt there would be any rutting
12 from a wild fire. There would be overturning of
13 standing dead trees though.

14 Q. And you would have nutrient removal
15 via the material harvested in man's harvest that you
16 wouldn't have in the same way with a wild fire?

17 A. Wouldn't be the same way, but there
18 would be nutrient losses, as I explained, in the
19 atmosphere and carried some distance which would be --
20 those dimensions we don't really know very much about
21 them.

22 Q. And there is going to be a removal of
23 a seed source through a harvesting method such as
24 full-tree harvesting that you wouldn't have...

25 A. Well, the trees are taken out, yes,

1 that seed source is removed.

2 Q. Right. And you don't have that same
3 sort of removal in a wild fire?

4 A. Well, some cones and seed are
5 consumed. There is a removal, but it is a different
6 act.

7 Q. But it is a removal by the
8 consumption by the fire?

9 A. That's correct.

10 Q. And obviously wild fire is
11 non-selective in the sense that it doesn't go after a
12 stand of any particular rotation age, it can hit young
13 stands?

14 A. No, that's correct.

15 Q. Old stands?

16 A. Yes.

17 Q. And a wild fire wouldn't create
18 landings; would it?

19 A. Not to my knowledge.

20 Q. Now, given that list of some of the
21 differences between wild fire and human disturbance,
22 wouldn't you agree with me that when we talk about the
23 similarities between natural disturbance and human
24 disturbance we also have to look at the differences as
25 well; don't we?

1 A. Yes.

2 Q. And even if one attempts to mimic
3 natural disturbance through man's intervention in the
4 forest, we are still in a position where we have to
5 deal with those natural disturbances?

6 A. Correct.

7 Q. And I guess my point here is that
8 while we may be intervening in the forest and
9 attempting to manage the forest, we still have to
10 somehow make allowances for natural disturbance because
11 we are not going to be able to prevent that?

12 A. Well, we have to accept and can only
13 minimize some of them. Some of them we have no control
14 over at all.

15 Q. So the best we can do is minimize the
16 effects of natural disturbance?

17 A. That's right.

18 Q. And you will recall that Mr. Cosman
19 asked you some questions with respect to the forest's
20 ability to regenerate itself over the past, and I
21 believe the timeframe he looked at was 10,000 years.
22 Do you recall that?

23 A. That was since the retreat of the
24 ice, I believe that was the ...

25 Q. And I believe your testimony in

1 response to one of his questions - and I don't have the
2 transcript - was to the effect that there is no
3 evidence that our forests are not regenerating?

4 A. That's correct.

5 Q. Now, in response to questions by Ms.
6 Swenarchuk, we talked a little bit about changes in
7 species composition. And is it fair to say that since
8 man's intervention in the forest, there has been a
9 significant change in species composition within the
10 province?

11 A. A significant change in terms of the
12 distribution or the amount? I am -- if you could
13 clarify that for me.

14 The species are still here that were
15 there before man's intervention, and within the boreal
16 there are vast extents of those -- that forest that
17 have still not had man's intervention; that is, in
18 terms of timber management.

19 Q. Well, to give you an example, what I
20 am thinking of in particular is that there has been a
21 significant decrease in the white pine composition in
22 the Great Lakes/St. Lawrence region since man's
23 intervention in the forest.

24 A. As far as -- the problem is we
25 don't -- we do know that the larger older stands that

1 were harvested or logged in the 1900s and into this
2 century do not exist, so we can presume that the
3 younger age-classes were not there to come through.
4 They wouldn't have been harvested til that time.

5 So there is a shift very much in the
6 age-class distribution by influence. There is also the
7 knowledge from the existence of where old stumps exist
8 in that area that some of the largest pines grew in
9 mixed stands and that those areas are now hardwood
10 forests with no white pine in it. So, in that sense,
11 there is a difference, yes.

12 Q. Would you agree with me that when we
13 talk about the forest's ability to regenerate, the
14 significant timeframe that we should be looking at is
15 not the past 10,000 years but the period since man has
16 intervened in the forest?

17 A. Well, in terms of man's objective,
18 that is the important period.

19 Q. I am not sure what you means by 'in
20 terms of man's objective'. What other -- who else's
21 objectives would you be talking about?

22 A. I took the question that Mr. Cosman
23 asked was: Has the forest that has existed here since
24 the retreat of the ice been subject -- if it has been
25 subject to major disturbances such as we recognize now,

1 has it had the capacity to regenerate naturally and the
2 answer to that was yes.

3 So that is the context in which I am
4 answering this.

5 Q. But if we want to evaluate the
6 ability of the forest to regenerate in the future,
7 shouldn't we be looking at what has happened since the
8 date at which man started to harvest the forest. Isn't
9 that the key date in terms of looking to future
10 management?

11 A. Well, that is part of it, but it
12 isn't the only one because, as I explained in Panel 2,
13 up until the last, virtually two to three decades,
14 there has been no management in the sense that we are
15 carrying out an undertaking management within the area
16 of the undertaking as we do now.

17 So there is a very significant change in
18 the nature of activities and the extent to which those
19 activities are occurring now as compared with 40 -- 30,
20 40, 50 years ago.

21 Q. And I guess your comment on
22 management, taken on a timeframe such as 10,000 years,
23 in terms of one trying to actually manage the forest,
24 that is a relatively new phenomena for the forest?

25 A. Yes, it is.

1 Q. Okay.

2 A. For our forests.

3 Q. I want to turn for a moment to the
4 question of how the unit forester would apply his
5 knowledge of the nutrient cycle when managing the
6 forest.

7 And I believe in your direct testimony
8 you explained that foresters do not measure the
9 nutrients cycle, per se, and actually quantify rates of
10 decomposition?

11 A. That's correct.

12 Q. And instead you talked about how a
13 forester will go out in the field and do a number of
14 things when he looks at a site, and I will just
15 summarize what I recollect from your testimony.

16 You said that he goes out and has a look
17 at the crown and, in particular, the density and the
18 colour of the needles?

19 A. Yes, correct.

20 Q. And he looks at the forest floor or
21 the duff, and he kicks the dirt, and he also has a look
22 at the soil itself; correct?

23 A. Yes, that's correct.

24 Q. And with respect to the soil, he
25 looks at its physical attributes, whether it is sandy,

1 whether it is clay or silt, whether it is a stoney
2 soil; correct?

3 A. Correct.

4 Q. And he also has a look at the
5 moisture content in the soil?

6 A. Yes.

7 Q. Now, if you could just turn to
8 Exhibit 429 which are the Ministry of the Environment
9 interrogatories and if you could turn to the Ministry
10 of the Environment Question No. 3 which is the first
11 one, and the question, referring to page 24 of your
12 evidence was:

13 "Both hydrological and nutrient cycles
14 may be altered by timber management
15 practices."

16 And our question was:

17 "Is the hydrologic cycle and nutrient
18 cycle determined on a stand basis or
19 management unit basis? How is this
20 accomplished?"

21 And I think in your answer you described, in a slightly
22 different way, what you have told us in your direct
23 testimony in terms of, you don't go out and measure a
24 nutrient cycle, per se.

25 A. That's correct.

1 Q. And if we look at that part of the
2 answer that starts on the fifth line down with: "
3 aspects..." Do you see that?

4 A. Yes, I can see.

5 Q. It says:

6 "Aspects of water or nutrient
7 Cycling which are manifested in forest
8 growth can be evaluated by the
9 professional forester on the basis of
10 local knowledge and experience."

11 And then it continues.

12 Am I correct that this would refer to the
13 local forester going out in the field and applying his
14 scientific knowledge of the nutrient cycle in the way
15 that you have described?

16 A. That would be correct.

17 Q. And the remaining part of the answer
18 on what the unit forester has available to him as you
19 refer to:

20 "Use of site classification systems such
21 as the Forest Eco-System Classification."

22 A. Yes, that was one example. I didn't
23 list all.

24 Q. And I believe we established in Panel
25 7 that an FEC only exists for the Clay Belt; isn't that

1 correct?

2 A. There is a Forest Eco-system
3 Classification, which I believe is in its interim form,
4 for the northcentral region and I believe also
5 northwestern, but there is also a handbook guide for
6 foresters for use in the northeastern region which
7 relates to the -- all the soil characteristics that
8 have been mentioned here.

9 So that covers essentially the four
10 northern regions. There have also been soil workshops
11 and courses in the Algonquin region.

12 Q. Would you agree with me that the best
13 way for the forester to assess an area to harvest in
14 terms of the nutrient component would be to go and have
15 a look at the site as you described in your evidence?

16 A. He may have a look at the exact site
17 or he may take information that is available to him
18 from photographs, from other documents, maps, for
19 example, relating to soils or soil materials and
20 certainly from the observations of his staff who may
21 indeed also competent to make those observations and
22 provide information. There is an array of sources,
23 that is really what I am suggesting.

24 Q. Well, in terms of the nutrient
25 component, what I am getting at here is that if you

1 can't measure a pool -- a nutrient pool or quantify it,
2 isn't the best way to be sure about whether or not a
3 site is in good shape in terms of the nutrient cycle is
4 to go and have a look at it?

5 I think that was the import of your
6 direct testimony when you talked about the forester
7 going out and looking at the canopy and kicking the
8 dirt.

9 A. Yes, but I think that from a
10 knowledge, as I say, from other sources, that may be
11 photographs, inventory information and so on, it is
12 quite possible, in fact it is the only feasible way in
13 terms of utilizing time to make some assumptions about,
14 if you like, the broad productivity or state of
15 productivity of the class.

16 I don't think that the foresters normally
17 think of it in terms of nutrient cycling, per se.

18 Q. Well, I appreciate that it is your
19 evidence that there are other things available, but the
20 best way to know for sure about the state of a site is
21 to go and look at it?

22 A. Oh, there is no doubt about that.

23 Q. Okay. And, in fact, there is
24 probably some inherent danger in projecting what is
25 learned from one site to other sites; is there not, in

1 terms of nutrients?

2 A. Well, there is an inherent danger in
3 just about every activity we take, including that one.

4 Q. But there is always going to be a
5 danger in making projections in terms of trying to take
6 information about one site and apply it to a range of
7 sites?

8 A. No, we do that all the time.

9 Q. Well, I think we will come back to
10 that later when we talk a little bit about full-tree
11 harvesting then.

12 With respect to the point you made about
13 the local forester learning from observations from his
14 staff, wouldn't those observations be ones that the
15 staff had made by going out and looking at a site?

16 A. They could well be. They may be
17 again drawn from other knowledge that is gained from
18 others too. I am thinking of the companies that may be
19 operating in the area, their staff would have knowledge
20 of certain conditions. So there is usually a
21 communication in that way or can be.

22 Q. Could you turn to the Ministry of the
23 Environment's Interrogatory Question No. 7, and that is
24 at Exhibit 429.

25 A. Yes, I have that.

1 Q. And Question 7(a) is referring to
2 page 38 of the Panel 9 witness statement. It says:

3 "MNR states that "for both the hydrologic
4 and nutrient cycles soil depth is
5 important"."

6 And our question was:

7 "In what percentage of the area of the
8 undertaking being cut annually is soil
9 depth known?"

10 And the response is:

11 "Such information is not recorded in a
12 form which would enable a response to
13 your question."

14 Now, is the information available in any form?

15 A. One would have to go to the unit
16 level to determine that. In some units where there are
17 soil surveys, there will be information relating to not
18 only the materials but the depth of those materials.

19 In other units, there may be - and,
20 again, the scale at which that information is recorded,
21 it will be relevant - but there may be geosurficial,
22 geological information in the form of maps or reports
23 for other areas. For some areas that information may
24 not exist at all, and would depend on local knowledge.

25 Again, the information at the unit level

1 may be related to aerial photography that is taken by
2 the Ministry to determine the nature of both the
3 vegetation and, from that, there may be areas where the
4 amount of shallow soils, if you will, can be deduced.

5 Q. Well, the information about soil
6 depth, I take it, is clearly uneven across the area of
7 the undertaking?

8 A. Yes, it is.

9 Q. And it would differ on a management
10 unit by management unit basis?

11 A. Yes, I would say that.

12 Q. Well, what I am looking for is a
13 clarification with respect to the answer because the
14 question asked:

15 "In what percentage of the area of the
16 undertaking is soil depth known?"

17 And answer is:

18 "...that such information is not
19 recorded."

20 A. In a form...

21 Q. "...in a form that would enable a
22 response to your question."

23 A. That's right.

24 Q. So what you are saying is that it is
25 recorded on a management unit basis?

1 A. Well, it may not even be recorded in
2 a formal sense in some area. That would be the case
3 where there was a formal survey that had been
4 undertaken, but it wouldn't be the case where, for
5 example, a decision is being made regarding activities
6 for a specific stand area and the depth of the soil or
7 other conditions may be taken into account, but
8 wouldn't necessarily be recorded on an area basis so
9 there is any compilation possible.

10 Q. Well, I take it if soil depth is
11 known within a management unit it would be recorded
12 somehow; is that correct?

13 A. If there is a formal -- that would
14 come, I think, where there are formal -- have been
15 formal soil surveys and those would be -- those units
16 with formal soil surveys for the total unit would be
17 very much in the minority. I can't think of very many
18 that would have them.

19 Q. Okay, and that is my point: Can you
20 tell us then how many units within the area of the
21 undertaking have formal soils surveys that would assist
22 you in soil depth?

23 A. I can't and I would also -- I would
24 believe that some of the units may only have soil
25 surveys for part of the area, but I cannot tell you

1 what the number of units are.

2 MS. SEABORN: Can that information be
3 gathered, Mr. Freidin?

4 MRS. KOVEN: Mr. Armson, after there is a
5 fire in the area, do the previous soil surveys still
6 apply or would you have to redo them because the
7 situation would be....

8 MR. ARMSON: No, I can't think of any
9 area where there has been a redoing of the soil survey.
10 Normally the effects of fire are peripheral, if you
11 like, to the mineral soil. It will affect the forest
12 floor layer, but that is something that is changing.
13 They are not normally redone, as they are in
14 agricultural areas.

15 MS. SEABORN: I don't think I have -- I
16 will wait for Mr. Freidin to respond.

17 MR. FREIDIN: I think the best thing for
18 us is to take that under advisement. I am trying to
19 find out if it as possible, first of all.

20 THE CHAIRMAN: Okay. Ms. Seaborn, I
21 think it is better if we allow Mr. Freidin time to
22 consult and see if that kind of information can be
23 provided without a great deal of effort in terms of the
24 value of having the information for your purposes.

25 MS. SEABORN: We'll come back to that

1 next week then. Thank you.

2 Q. Mr. Armson, last week Mr. Martel
3 asked you a question regarding nutrient pools. And as
4 I recall, this was at the point in your evidence when
5 you were describing historically how nutrients are
6 affected by harvesting. Do you recall that testimony?

7 A. Generally, yes.

8 Q. And specifically, I believe Mr.
9 Martel asked you whether a conclusion could be drawn
10 that a certain amount of the slash should be left in
11 the forest when harvesting in an effort not to deplete
12 nutrient pools?

13 A. Yes, I remember that.

14 Q. And I believe you responded that if
15 the pool size in the forest floor and the pool size in
16 the mineral soil was large, then you may not be
17 removing a large number of nutrients. Do you recall
18 that?

19 A. Yes, I do.

20 Q. And maybe we will just go to the
21 transcript, Volume 72 at page 12204 -- sorry, I think I
22 have the wrong page number, just let me check that.

23 I seem to have brought every other
24 transcript but that one. I have the quote, and maybe
25 subject to check I could just read in what I had

1 written down in my notes you had said.

2 And the reason you gave with respect to
3 the fact that a large number of nutrients may not be
4 removed through the slash was that the amount may in
5 fact not be large in relation to the total capital that
6 you have and it certainly may have no effect in the
7 rates of flux that come from that capital.

8 Do you recall that testimony?

9 A. Yes, I do.

10 Q. I just want to deal for a moment with
11 this question of nutrient removal. Now, as I
12 understand the evidence, to make a nutrient available
13 you require a flux; correct?

14 A. Well, the flux is just a word to
15 describe, if you like, the movement of nutrients from
16 one pool to another.

17 Q. Right. And we looked at that diagram
18 with the pools and the arrows and showing the nutrients
19 moving around?

20 A. Yes.

21 Q. And we determined that it is not --
22 the approach that is not used is to measure flux;
23 correct?

24 A. There have been some attempts and
25 some measurements of some of them, but it is most

1 difficult to measure certain of those movements.

2 Q. Now, you have said that nutrient and
3 slash may be very small compared to the soil pool.
4 Would you agree with me that nutrients in slash may
5 however account for a large proportion of available
6 nutrients?

7 A. It would vary. In some instances
8 they might, but I would suggest that in fact the amount
9 of nutrients in the forest floor, which is in a greater
10 state of decomposition than the slash sitting above it,
11 that there would be a greater availability in the
12 forest floor than in the slash itself, that is of
13 available nutrients, because of the state of
14 decomposition.

15 Q. Let's just look at an example. If
16 you turn to page 95 of Exhibit 414, which is the Panel
17 9 witness statement.

18 A. Yes, I have that.

19 Q. And do you have Table 4 in front of
20 you?

21 A. Yes, I do.

22 Q. Now, let's just take the example of
23 nitrogen. Using this example, if you were full-tree
24 harvesting, you would be removing 35 per cent of the
25 nitrates through the boles; correct?

1 A. It says nitrogen.

2 Q. Sorry, nitrogen.

3 A. Yes.

4 Q. And because the full-tree harvesting
5 method doesn't remove all of the crown, stump and
6 roots, let's just use for an example that through the
7 full-tree method you would be removing, say, one half
8 of that 51 per cent for argument; would you accept
9 that?

10 A. Well, yes, I will accept that.

11 Q. Is that a reasonable assumption, that
12 of the crown --

13 A. It is not an unreasonable one. I
14 don't know what the exact number would be, but it would
15 be greater.

16 Q. And because this example is in terms
17 of full-tree harvesting we don't have that breakdown
18 between those three components?

19 A. Yes.

20 Q. So that would leave us with 25 per
21 cent of the nitrogen removed through the crown and
22 another 35 per cent removed through the boles; correct?

23 A. Yes, that's right.

24 Q. Now, in order to regrow a tree, you
25 have to look at the nutrients that remain available to

1 sustain that growth; don't you?

2 A. Yes, in all the sources and forms.

3 Q. That's right. In all the sources,
4 but the key number is what is available; isn't it?

5 A. Not necessarily.

6 Q. Why wouldn't it?

7 A. Because of the method -- methodology
8 by which the availability is determined. And this is
9 made clear in numerous papers, and more particularly
10 the ones in Mahendrappa et al.

11 Q. Well, wouldn't you agree with me that
12 in this example the available pool of nitrogen that
13 would remain to support the next generation has clearly
14 been diminished by removing the boles and the slash?

15 A. It may or may not be. The numbers
16 there do not tell us that at all.

17 Q. Well, you only have available
18 nitrogen in the soil at 14 per cent; correct?

19 A. That's correct, in terms of the
20 availability as measured by the methods used here at
21 some instant in time.

22 Q. Well then, is it your position that
23 the measurements and the methodology used in this
24 instance can only be applied to this particular jack
25 pine stand?

1 A. No, it is not that they can only be
2 applied to it, that they only can signify certain
3 features from which conclusions could be drawn and it
4 is not only myself that would take that position.

5 Q. We talked a little bit about
6 weathering in your direct testimony and weathering of
7 rock minerals is a long-term proposition; isn't it?

8 A. It has been going on for many
9 thousands of years, yes.

10 Q. That's right. And would you agree
11 with me that the information that we have on fluxes to
12 date is such that we just don't know if weathering
13 rates and decomposition rates are sufficient to make up
14 any nutrient shortfalls that may occur as a result of
15 man's harvest?

16 A. The only evidence we have is the
17 stands that have been established naturally or
18 otherwise on such areas and they do not indicate a
19 diminished supply.

20 Q. But I am not asking about results, I
21 am just saying that in terms of where we are in the
22 information on this area, the studies are relatively
23 new in terms of how long the forest has been around?

24 A. The studies on how long the forest
25 has been, around from man's invention, are relatively

1 recent. We have areas such as -- from the 19th Century
2 of many stands, but they were harvested differently.

3 Q. No, I accept that we have the trees.
4 What I am saying is that we don't have the
5 scientific -- we haven't have a hundred years' worth of
6 scientific knowledge or scientific studies on this
7 issue of fluxes and decomposition of weathering rates?

8 A. That is correct.

9 Q. And so in terms of looking at
10 nutrient shortfalls, this is a relatively new area?

11 A. Relatively new.

12 Q. And I think the earliest studies that
13 we have been referring to when we looked at them is
14 from the 1970s; is that correct?

15 A. In this part of the world, yes, not
16 elsewhere.

17 Q. Okay. Just one more question on that
18 area, Mr. Armson. Would you agree with me that
19 decomposition rates in terms of nutrient removal are
20 faster than weathering of rock?

21 A. Yes, I believe that that would be the
22 case.

23 Q. Okay. Thank you.

24 A. There are some exceptions, but they
25 are minor.

1 Q. Such as...?

2 A. Where you have organic material that
3 is laid down and, because of specific temperature and
4 persistent moisture conditions, the decomposition rates
5 are extremely low, and I would cite the building up of
6 peat deposits as the best example of that.

7 MRS. KOVEN: Excuse me. Does the age of
8 the tree have any effect on decomposition--

9 MR. ARMSTRONG: Not directly.

10 MRS. KOVEN: --as the material is
11 decomposed?

12 MR. ARMSON: No. The foliage that is
13 added in the litter is normally, if you like, it is of
14 a consistent quantity -- not quantity, but the quality
15 is fairly consistent over a considerable span of age.

16 In other words, a four-year-old needle
17 from a spruce tree that falls on the ground from a
18 25-year-old spruce would probably be very similar on
19 the same site as an 80-year-old spruce, a needle coming
20 from an 80-year-old spruce.

21 MS. SEABORN: Mr. Chairman, the area I
22 was going to deal with next requires reference to some
23 of the exhibits that I have referred to that people
24 would not have handily with them.

25 And I apologize for that, but because

1 some of the questions with the interrogatories, Mr.
2 Freidin is going to consult and get back to me, I have
3 had to skip a section. I hadn't expected to move into
4 these exhibits today.

5 So we can either break and people could
6 collect them, or I could --

7 THE CHAIRMAN: Well, it probably doesn't
8 make much sense, since it would take some time to get
9 them and we have only got about a half hour to go. We
10 are going to have to break at two in any event.

11 So I think, in the circumstances, since
12 we are going to be continuing with your
13 cross-examination next week anyways, we might as well
14 just wait until we recommence on Tuesday.

15 MR. FREIDIN: Any further word from OFAH?

16 THE CHAIRMAN: Yes. We have been given
17 to understand that they estimate the time of their
18 cross-examination to be approximately one half a day.

19 Now, that estimate was given in the light
20 of, as I understand it, them not having retained a
21 counsel yet who is going to conduct that
22 cross-examination. I may have it wrong, but that was
23 my understanding.

24 When counsel looks at the situation the
25 estimate of a half a day may be over or under in terms

1 of time. But we have indicated clearly to that party
2 that they will be expected to be in a position to
3 commence their cross-examination some time Tuesday
4 because we anticipate that you will be through -- well,
5 perhaps in the morning.

6 MS. SEABORN: I would expect that I will
7 be finished no later than the lunch break.

8 THE CHAIRMAN: Very well. So that they
9 should be able to commence in the afternoon. And if
10 any of those estimates are even close, it seems that we
11 should probably be ready for Panel 10, at least the
12 commencement of it, some time on Wednesday.

13 MR. FREIDIN: We could be. I think
14 whether I would want to go ahead would depend on when,
15 during the Wednesday, I finish my re-examination. It
16 may -- I don't know, it may be a lengthy one.

17 THE CHAIRMAN: Well, that's true, you do
18 have re-examination and I was just assuming you would
19 be your normal efficient amount of time, Mr. Freidin,
20 and not occupy more than a couple of hours, but you may
21 decide that you need more on this panel.

22 In any event, we are hoping to start
23 Panel 10 next week and then continue the following
24 week.

25 I should remind the parties that we

1 intend to sit, as you are aware, next week on Friday
2 but we will not be sitting on Monday.

3 MS. SEABORN: Mr. Chairman, just before
4 we break. Mr. Armson, in terms of the white pine, I
5 would also like to have a copy of the most recent FRI
6 in terms of that area.

7 MR. ARMSON: I think that would be
8 available.

9 MS. SEABORN: Okay. Thank you.

10 THE CHAIRMAN: Okay. Ladies and
11 gentlemen. We have the site visit tomorrow morning, so
12 we will be adjourning until next Tuesday at 9:00 a.m.

13 Thank you.

14 MS. SWENARCHUK: The week after next it
15 is Monday to Friday; right?

16 THE CHAIRMAN: Yes, the week after next
17 was going to be a five-day week.

18 MS. SWENARCHUK: And we start on the
19 Monday at noon, or in the morning?

20 THE CHAIRMAN: Sorry?

21 MS. SWENARCHUK: We start...

22 THE CHAIRMAN: Monday we are going to
23 start at one. Next week we are starting at nine on
24 Tuesday and parties are expected to come in Monday
25 night.

1 The following week we will start at 1:00
2 p.m. on the Monday and that will give everyone an
3 opportunity to come up Monday morning.

4 MS. SWENARCHUK: And Friday we are
5 adjourning at what time?

6 THE CHAIRMAN: Friday we are going to
7 adjourn at probably one or 1:30 so that everyone can be
8 on the afternoon plane back.

9 MR. FREIDIN: Can I just have a moment,
10 Mr. Chairman. I am just inquiring as to what we have
11 received in terms of scoping for Panel 11 to see
12 whether that is something that we can schedule.

13 THE CHAIRMAN: The other issue that we
14 are also going to address - and I think we will try and
15 address it next week at some appropriate time - is the
16 way in which Dr. Baskerville was going to be dealt
17 with.

18 And the Board has requested counsel to
19 give that some consideration, particularly the concept
20 of perhaps the Board calling Dr. Baskerville as its
21 witness with Board counsel leading Dr. Baskerville
22 through an examination.

23 MS. SWENARCHUK: Mr. Chairman, we have
24 had some interest in calling an American expert on
25 wildlife service within the U.S. Forest Service. We

1 are informed that employees of the Forest Service are
2 not allowed to testify in foreign proceedings unless
3 called by a government body.

4 The issues we think these people could
5 explain for the Board have to do with the integration
6 of wildlife management into forest management, and I
7 have considered requesting -- suggesting that the Board
8 might find it useful to call one of these individuals.

9 THE CHAIRMAN: If the Board should agree
10 to that suggestion, would it be the Board's witness or
11 would it be the Board requesting the witness' presence
12 and then the witness would be your client's witness
13 with the attendant responsibility of examining the
14 witness in-chief and that person being subjected to
15 cross-examination by other parties, et cetera?

16 MS. SWENARCHUK: I hadn't actually
17 thought that through, Mr. Chairman, and I am raising it
18 now more or less for some direction from you as to
19 whether this is an issue that you might be interested
20 in considering.

21 THE CHAIRMAN: Well, put it this way: I
22 think we would be in a better position to consider it,
23 Ms. Swenarchuk, if you decided and made a formal
24 request as to your desire to call such a witness, what
25 areas this witness would, in your opinion, be dealing

1 with, and why you feel it is appropriate that the
2 witness be called in the first place, and who would be
3 leading the evidence through examination, et cetera.

4 If you sort out some of those questions,
5 then I think the Board might be prepared to consider
6 the request and what its ramifications are.

7 It is not the first time, I think in
8 these types of proceedings, that witnesses from other
9 jurisdictions have testified, and I can assure you from
10 what I understand in the upcoming OWMC case, there will
11 be a variety of witnesses from around the world
12 testifying in that case. So it is not something that
13 the Board has never confronted before.

14 But I think we would like to see a
15 specific proposal rather than just trying to give you
16 an answer in general terms without really considering
17 the impacts.

18 And you will have, and the other parties,
19 Mr. Freidin, will have an opportunity should a formal
20 request be put before the Board to, of course, respond
21 to it at the appropriate time.

22 MR. FREIDIN: I have another matter.

23 THE CHAIRMAN: Yes.

24 MR. FREIDIN: In relation to that
25 scoping, I believe that the extension in time was to

1 the beginning of this week -- I think you gave a week
2 extention for filing their issues.

3 THE CHAIRMAN: We did because we weren't
4 even up to Panel 10 and we expect Panel 10 to take some
5 numbers of days, so we felt that the parties shouldn't
6 necessarily have to rush.

7 MR. FREIDIN: That's right. But the week
8 has passed, there are a lot of people who are involved
9 in 10 are also involved in 11, it becomes very
10 difficult to get them thinking about 11 issues and
11 responding to -- giving me instructions on that when in
12 fact they are involved in 10.

13 We have received submissions from the
14 Nishnawbe-Aski Nation, OFIA, and the Ministry of the
15 Environment to date. I would ask that the other
16 parties please get their submissions to us. I would
17 like to have them by the end of the week, if I could,
18 because I -- no later than the first of next week,
19 because I would like to have that scoping session
20 before I start 10.

21 THE CHAIRMAN: The Board has extended the
22 time. I think we will set as a deadline next Tuesday
23 for the submission of the Panel 11 statements of issues
24 from other parties. And next week we will settle upon
25 a scoping session for Panel 11, at least a date for it.

1 MR. FREIDIN: I am just advising you now
2 that if it is humanly possible, at least as far as I am
3 concerned for me, I am going to want to have that
4 scoping session before Panel 10 starts for the reasons
5 I indicated.

6 THE CHAIRMAN: Why can't the scoping
7 session take place during Panel 10?

8 MR. FREIDIN: Because, as you will
9 appreciate, No. 1, there is going to be a problem with
10 witnesses being tied up, but perhaps even more
11 importantly all of these panels are inter-related.

12 And if I have some sense of how issues
13 are being formulated in 11, that may affect how my
14 witnesses can be helpful to the Board in Panel 10.

15 THE CHAIRMAN: Well, we certainly would
16 like to be afforded whatever assistance and help we can
17 in that area, so we will certainly give it
18 consideration and may be holding a scoping session
19 possibly even next week before we get into 10.

20 MR. FREIDIN: Thank you. It may turn
21 out, because of the volume, that we just can't do that.
22 I am just indicating what my initial desire was.

23 THE CHAIRMAN: If not, Mr. Freidin, we
24 will try and hold the scoping session early on in Panel
25 10. We do not want to hold up the start of Panel 10

1 just because we have not done the scoping.

2 MR. FREIDIN: We have got the slide
3 projector heated up, Mr. Chairman, and we are eager to
4 go.

5 THE CHAIRMAN: Well, we certainly won't
6 hold you back.

7 Okay, ladies and gentlemen, Tuesday
8 morning at nine.

9 Thank you.

10 ---Whereupon the hearing adjourned at 1:30 p.m., to be
11 reconvened on Tuesday, February 28th, 1989,
commencing at 9:00 a.m.

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